ARRI

Pocket Guide

ALEXA

SUP 9.1

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Overview

Introduction

Welcome to the Pocket Guide for the ALEXA and the ALEXA XT family of cameras, which contains important preproduction and production information for an ALEXA shoot. The ALEXA platform has been designed with ease of use and user-friendliness in mind; the menu and controls are simple and intuitive, so the best way to learn ALEXA is to get your hands on the real thing. However, carrying this guide with you and combining it with other resources such as the ALEXA manual at www.arri.com/alexa/downloads or the interactive ALEXA/ALEXA XT Camera Simulator at www.arri.com/alexa/tools will ensure your readiness to take full advantage of the camera's unique and versatile features.

The ALEXA and the ALEXA XT family

ALEXA

ALEXA XT

ALEXA XT M

ALEXA XT Plus

ALEXA XT Studio

New features in SUP 9.0 and 9.1 for all ALEXA and ALEXA XT cameras

Software Update Packet (SUP) 9.0/9.1 enables a number of new features for all ALEXA and ALEXA XT cameras. It adds new recording capabilities, codec options and provides the basis for the use of new recording media and new ARRI accessories. This SUP also contains software update 1.37 for the ALEXA Electronic Viewfinder EVF-1, which fixes an issue that was discovered in EVF software 1.36.

Now available on all ALEXA XT cameras as well as for DNxHD license owners is DNxHD 444. This is the higest DNxHD flavour available which brings full color fidelity and Log C capabilities to ALEXA.

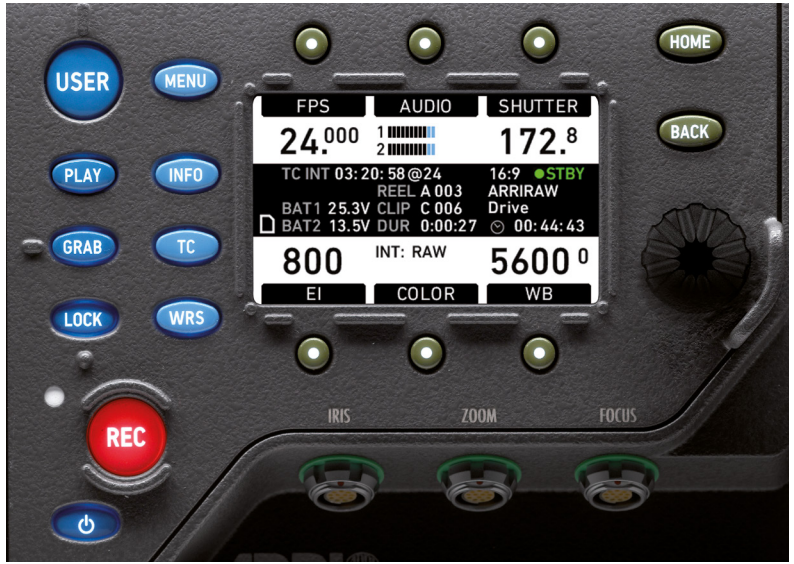
In our manner to keep ALEXA an open, future prove camera we have adopted the successor of the Compact Flash card for recording on ALEXA: CFast 2.0 (CompactFlash ATA Serial Transfer Standard 2.0, issued 2012). All ALEXA XT series cameras, ALEXAs with XR Module as well as the ARRI AMIRA camera support CFast 2.0. Other manufacturers have also committed to support this new standard in their devices.

Feature Overview

- ProRes 4444 16:9 High Speed recording up to 120 fps[1]
- Pre-recording for ProRes (loop recording)
- Improved DNxHD 4:2:2 recording up to 120 fps
- DNxHD 4:4:4 recording up to 96 fps
- Phase user button
- Improved color management
- Increased CC range for white balance
- Support for CFast 2.0 media[1]
- Preparation for Open Gate ARRIRAW[2]
- Improved Lens Table programming
- Support for upcoming WCU-4 capabilities
- User Pixel Masking
- Support for 1.4x and 2x Alura LDS Extenders

[1] ALEXA XT series cameras and XR Module cameras only
[2] ALEXA XT series cameras only

The Home Screen



Home Screen Soft Buttons

The soft buttons lead to screens where the respective settings can be changed. In the home screen, the following info is displayed:

FPS: Set sensor frame rate

AUDIO: When audio is active, audio levels are shown. Audio can also be switched OFF, or DISABLED (when the sensor is not running at sync-sound speed)

SHUTTER: Set shutter angle (and turn mirror shutter on/off for ALEXA Studio)

EI: Set exposure index (and insert internal ND filter for ALEXA Studio)

COLOR: Set gamma for REC OUT and SxS image paths. If REC and/or SxS icons have a blue background, a look is active on this image path.

WB: Set white balance, consisting of a Kelvin value for red-blue correction and a CC shift for green-magenta correction (shown as exponent).

ALEXA Studio Icons

Name	Icon	Description
Mirror Shutter	M S	Flashing Icon when the Mirror Shutter is spinning.
View Position	V	Mirror Shutter in View position
Gate Position	G	Mirror Shutter in Gate position
ND filter	ND	ND filter active

Home Screen Center Bar

TC	Displays current timecode including source (INT=internal or EXT=external source). Frames are not displayed, instead the time base of the timecode is shown in small digits.
MASTER	Camera is set to Ext sync: MASTER
SLAVE	Camera is set to Ext sync: SLAVE
	Settings sync is active.
BAT 1	Voltage level of power source present at BAT connector, or percentage of remaining capacity of attached battery if it transmits this information.
BAT 2	Voltage level of battery attached to top and/or back onboard battery adapter, or percentage of remaining capacity of attached battery if it transmits this information.
REEL	Identifies current reel. Consists of camera index and reel counter.
CLIP	Identifies current clip. Consists of clip index and clip counter.
DUR	Duration of current clip during recording or length of last recorded clip during standby. Shown as h:mm:ss.
16:9	Displays active sensor mode (16:9 or 4:3).
ProRes 2K	Displays active recording format (ARRIRAW, ProRes (HD or 2K) or DNxHD).
SxS Pro Drive	SxS PRO adapter or XR Capture Drive inserted into slot.
00:19:28	Remaining capacity of loaded magazine.
FULL	Loaded Magazine is full.
No Media	No Magazine in slot.
Type	Magazine does not support the currently selected Recording format.
SxS 1 24:26 [1]	Remaining capacity of card in SxS slot 1 in minutes. Calculated for the set frame rate and codec. Note: these are only approximate values.
SxS 1 INHIB [1]	Card 1 is write protected.
SxS 1 FULL [1]	Card 1 is full.
<	Marks the active card.
• STBY	The camera is in standby and ready to record.
• PRE	The camera is recording frames into its ring buffer.
• REC	The camera is recording.
• ERROR	An error occured. Recording is not possible. Press the INFO button for more details. If nothing is shown (neither the red/green bar), the camera works properly, but no SxS PRO card is present for recording.
INT/SxS	INT: Look INT: CDL Server active/connected INT: CDL Server active/not connected

[1] not available on ALEXA XT

Icons on Home Screen

Name	Icon	Description
General Warning		Important information waiting on the info screen. Press the INFO button for more details.
General Error		An error occurred. Press the INFO button for more details.
Temperature Warning		Slight sensor temperature offset. Image quality might be affected.
Temperature Error		Great sensor temperature offset. Image quality might be affected seriously.
Lock		Camera is locked.
SD Card		SD Card present. Turns orange during card access.
Grab		Still frame is being captured to the SD card. A new still frame can only be captured when this is completed.
High Humidity Mode		Sensor is in high humidity mode (= 40° C sensor temperature). Should only be used in very humid conditions (e.g. indoor swimming pool).
WRS Radio		WRS radio is active. Only on ALEXA Plus and Studio.

ALEXA Studio left side. Additional buttons VIEW & GATE for mirror control.

MON OUT Icons

Name	Icon	Description
General Warning		Important information waiting on the info screen. Press the INFO button for more details.
General Error		An error occurred. Press the INFO button for more details.
Temperature Warning		Slight sensor temperature offset. Image quality might be affected.
Temperature Error		Great sensor temperature offset. Image quality might be affected seriously.
Lock		Home screen is locked.
Grab		Stil frame is being captured to the SD card. A new still frame can only be captured when this is completed.

Name	Icon	Description
Peaking	PEAK	Peaking enabled for EVF and/or MON OUT.
Smooth mode	SMTH	Smooth mode active on EVF.
Recording resolution	HD 2K RAW	Displays current SxS resolution (HD or 2K).
Gamma	LOG 709	Displays Gamma setting for EVF or MON OUT.
Look active	EVF INT MON REC	A look is active/burned-in on EVF, MON OUT and/or Internal recording.
	CDL CDL	CDL server connected/disconnected.
Return IN	RET	Return is active, image from RET/SYNC IN input is shown.

Recording Media

An ALEXA camera can be equipped with an SxS Module or the new XR Module for internal recording. The SxS Module can record QuickTime/ProRes or MXF/DNxHD files on Sony SxS PRO cards. SxS PRO cards have an ExpressCard34 form factor and are available with a capacity of 32 and 64 GB. ALEXA cameras with an XR Module can also record to Sony SxS PRO, CFast 2.0 cards or to Codex XR Capture Drives, which additionally enables uncompressed ARRIRAW recording. Using SxS PRO or CFast 2.0 cards requires a mechanical Adapter from ARRI and does not allow recording ARRIRAW data. Codex XR Capture Drives share the same mechanical interface as other Codex Capture and Transfer Drives, only XR drives can be used for recording on ALEXA cameras.

The table below shows the data rates and storage requirements for the available recording formats[1].

Recording Media	64GB SxS PRO			120GB CFast 2.0			XR Capture Drive		
Recording Format	fps Range[2]	Recording Time @ 24 fps	Recording Time @ max fps	fps Range[2]	Recording Time @ 24 fps	Recording Time @ max fps	fps Range[2]	Recording Time @ 24 fps	Recording Time @ max fps
16:9 ARRIRAW 2.8K	–	–	–	–	–	–	0.75 – 120	47 min	9 min
4:3 ARRIRAW 2.8K	–	–	–	–	–	–	0.75 – 90	35 min	9 min
Open Gate ARRIRAW	–	–	–	–	–	–	0.75 – 75	29 min	9 min
16:9 ProRes 4444 HD[3 4]	0.75 – 60	29 min	11 min	0.75 – 120	53 min	10 min	0.75 – 120	107 min	21 min
16:9 ProRes 4444 2K[3]	0.75 – 60	28 min	10 min	0.75 – 60	46 min	18 min	0.75 – 60	93 min	37 min
4:3 ProRes 4444 2K[3]	0.75 – 48	19 min	9 min	0.75 – 48	35 min	17 min	0.75 – 48	70 min	35 min
16:9 ProRes 422 HQ HD[3]	0.75 – 120	43 min	8 min	0.75 – 120	80 min	16 min	0.75 – 120	160 min	32 min
16:9 ProRes 422 HQ 2K[3]	0.75 – 60	38 min	15 min	0.75 – 60	70 min	28 min	0.75 – 60	140 min	56 min
4:3 ProRes 422 HQ 2K[3]	0.75 – 48	28 min	14 min	0.75 – 48	52 min	52 min	0.75 – 48	105 min	52 min
16:9 DNxHD 444	0.75 – 60	24 min	9 min	0.75 – 90	43 min	17 min	0.75 – 96	85 min	34 min
16:9 DNxHD 175x/185x/220x	0.75 – 120	48 min	9 min	0.75 – 120	87 min	35 min	0.75 – 120	170 min	34 min
16:9 DNxHD 115/120/145	0.75 – 120	72 min	14 min	0.75 – 120	132 min	53 min	0.75 – 120	255 min	51 min

[1] ProRes 422, 422 (LT) and 422 (Proxy) are also available, but left out for reasons of clarity.
[2] All speeds adjustable with 1/1000 fps precision. To record above 60 fps in any format, the camera needs to be switched to high speed mode.
[3] ProRes is a variable bit rate codec. Actual data rate and recording time varies depending on image content.
[4] ProRes 4444 high speed mode is not available on ALEXA classic cameras.

ALEXA XT Recording Matrix

Recording Media		Internal recording onto XR Capture Drives				Internal Recording with SxS PRO or CFast 2.0 adapter (onto SxS PRO/CFast 2.0 card)			External recording
Recording Format		**ARRIRAW** uncompressed	**HD** ProRes & DNxHD[1]	**HD Highspeed** ProRes & DNxHD	**2K** ProRes	**HD** ProRes & DNxHD	**HD Highspeed** ProRes & DNxHD[1]	**2K** ProRes[2]	**HD** uncompressed
Sensor Mode	16:9	2880x1620 *(0.75-120fps)*	1920x1080 *(0.75-60fps)*	1920x1080 *(60-120fps)*	2048x1152 *(0.75-60fps)*	1920x1080 *(0.75-60fps)*	1920x1080 *(60-120fps)*	2048x1152 *(0.75-60fps)*	1920x1080 *(0.75-60fps)*
	4:3	2880x2160 *(0.75-90fps)*	–	–	2048x1536 *(0.75-48fps)*	–	–	2048x1536 *(0.75-48fps)*	–
	Open Gate	3414x2198 *(0.75-75fps)*	–	–	–	–	–	–	–

[1] DNxHD 444 is not available in Highspeed Mode
[2] 2K ProRes recording is limited to 30fps on 32GB SxS Pro cards

ALEXA Recording Matrix

Recording Media		Internal Recording onto SxS PRO cards			External recording via T-Link	External recording via HD-SDI
Recording Format		**HD** ProRes & DNxHD	**HD Highspeed** ProRes & DNxHD[1]	**2K** ProRes[2]	**ARRIRAW** uncompressed	**HD** uncompressed
Sensor Mode	16:9	1920x1080 *(0.75-60fps)*	1920x1080 *(60-120fps)*	2048x1152 *(0.75-60fps)*	2880x1620 *(0.75-60fps)*	1920x1080 *(0.75-60fps)*
	4:3	–	–	2048x1536 *(0.75-48fps)*	2880x2160 *(0.75-48fps)*	–
	Open Gate	–	–	–	–	–

[1] DNxHD 444 is not available in Highspeed Mode
[2] 2K ProRes limited to 30fps on 32GB SxS Pro cards

ALEXA XT Output Overview

- 1 or 2x MON OUT → HD-SDI 16:9 → HD-SDI with information overla
- 2x REC OUT → HD-SDI 16:9 → Clean image
- 2x REC OUT → ARRIRAW (16:9, 4:3 or Open Gate) → uncompressed
- 1x XR Capture Drive
- 1x XR Capture Drive or SxS card or CFast 2.0 card → Quicktime 16:9 HD or 16:9/4:3 2K
  - ProRes Proxy
  - ProRes 422 LT
  - ProRes 422
  - ProRes 422 HQ
  - ProRes 4444
- 1x XR Capture Drive or SxS card or CFast 2.0 card → MXF 16:9 HD
  - DNxHD 145
  - DNxHD 220x
  - DNxHD 444

ALEXA Output Overview

- 2x REC OUT → T-Link → ARRIRAW uncompressed (16:9 or 4:3)
- 2x REC OUT → HD-SDI → HD uncompressed 16:9 (4:4:4 or 4:2:2)
- 1 or 2x MON OUT → HD-SDI 16:9 → HD-SDI with information overlay
- 2x SxS Cards → Quicktime HD, 2K 16:9 or 4:3
  - ProRes Proxy
  - ProRes 422 LT
  - ProRes 422
  - ProRes 422 HQ
  - ProRes 4444
- 2x SxS Cards → MXF 16:9 HD
  - DNxHD 145
  - DNxHD 220x
  - DNxHD 444

ARRIRAW uncompressed

ARRIRAW data delivers uncompromised image quality from an ALEXA camera. It offers the highest achievable resolution, the camera's natural color response and great exposure latitude as uncompressed and unprocessed sensor data. With the introduction of the ALEXA XT series, ARRIRAW data can be recorded directly in the camera at up to 120 fps, which makes using ARRIRAW as your chosen format easier than ever before.

Like film negative, ARRIRAW data has to be processed to produce a color image. ARRIRAW images have only one channel. A color reconstruction algorithm calculates the missing components of each pixel based on the type and position of the array of colored filters (Bayer pattern) on the camera sensor. As a result, half of the reconstructed image's green values are interpolated from the surrounding photosites rather than captured, as are three-quarters of the red and three-quarters of the blue.

The ALEXA sensor provides a horizontal resolution of about 3K pixels, from which downsampling routines produce optimized HD and 2K resolution images. For VFX, however, the images often are processed using the native sensor pixel count and then downscaled to for example 2K at a later stage.

With the release of SUP 9.0 an additional ARRIRAW mode has become available. It is called **Open Gate**. In this format the captured frame extends beyond the surround view area that can be seen in the electronic viewfinder. The active frame size of this format is 28.25 x 18.17 mm (image circle: 33.5 mm), or 3414 by 2198 pixels with an aspect ratio of 1.55:1. Since the Open Gate aperture is wider than a Super 35 frame, please make sure that the lenses you are using actually cover the whole area. Wide angle lenses are more critical in this respect than long focal lengths.

Format	Resolution	Color Coding	File size	Data Rate @ 24 fps	Data Volume @ 24 fps	fps Range[1]
16:9 ARRIRAW 2.8K	2880 x 1620	12 bit Bayer	7 MB	1.34 Gbit/s	605 GB/h	0.75 - 120
4:3 ARRIRAW 2.8K	2880 x 2160	12 bit Bayer	9.3 MB	1.79 Gbit/s	806 GB/h	0.75 - 96
Open Gate ARRIRAW[2]	3414 x 2198	12 bit Bayer	11.3 MB	2.17 Gbit/s	976 GB/h	0.75 - 75

[1] All speeds adjustable with 1/1000 fps precision.
[2] Open Gate mode is only available on ALEXA XT cameras.

ARRIRAW Converter 3.0

The ARRIRAW Converter (ARC) is a free software solution that reads, displays and renders ARRIRAW files. Since in 2005 the first ARRIRAW files from the D20 camera have been shot, ARC has undergone some iterations and gained more capabilities. In 2012 we decided to develop a completely new version of the ARRIRAW Converter which has been released at IBC 2013.
Version 3.0 features a new user interface in combination with a feature rich tool palette. Working with ARRIRAW has become more intuitive and straight forward from browsing through the images to reviewing and finally rendering to other file formats.

To allow a quick start with ARC 3.0 we've created a series of tutorial videos on all available features. Also including the new User Pixel Mask, a feature introduced to ALEXA cameras in SUP 9.0: www.arri.com/goto/arriraw-tutorials

ARRIRAW Converter 3.0 is available for Mac OSX. A version for Windows operating systems will be released soon.

Download ARC at the ARRIRAW Downloadpage:
http://www.arri.de/alexa/arriraw

ARRIRAW capable software solutions

A product which has been awarded the ALEXA ARRIRAW Processing Certificate is capable of rendering ALEXA ARRIRAW images in a quality that meets ARRI's requirements. Please note that for all image processing parameters (such as sharpness, color etc.) the ARRI SDK, which is also part of the ARRIRAW Converter, is the reference.

CERTIFIED FOR ARRIRAW PROCESSING ALEXA

You can find more information about working with ARRIRAW at www.arri.com/alexa/workflow. Further documents, covering ARRIRAW and other topics, such as the "ALEXA VFX FAQ", are available for download at www.arri.com/alexa/downloads.

COMPANY	PRODUCT	CERTIFIED
Adobe	Premiere Pro	✔
Adobe	Speedgrade	
Assimilate	Scratch Scratch Lab	✔
Autodesk	Flame/Lustre	✔
Autodesk	Smoke	✔
Blackmagic Design	Resolve	✔
Codex Digital	Transfer Station	✔
Colorfront	On-Set Dailies	✔
DigitalFilmTechnology	Flexxity	✔
DVS	Clipster	✔
Éclair	ColorUsDailies	✔
eyeon	Fusion	✔
FilmLight	Baselight	✔
Glue Tools	ARRIRAW Toolkit for Mac OS X	
Image Systems/ Digital Vision	Nucoda FilmMaster	✔
MTI Film	Control Dailies Enterprise Cortex: Control Dailies Cortex: Convey	✔ ✔
Pretend	Stereoid	✔
Quantel	Pablo	✔
SGO	Mistika	
The Foundry	Hiero	
The Foundry	Nuke	
Tweak	RV	

Overview

ProRes Recording

The ALEXA/ALEXA XT is the first camera offering internal, ready-to-edit, QuickTime/ProRes HD. With SUP 7.0, all cameras received a free upgrade enabling QuickTime/ProRes 2K recording. Recording in ProRes 2K is a cost-efficient alternative to shooting ARRIRAW, as it requires less storage space and no processing, but at the same time delivers an image quality that is superior to that of up-scaled HD material. With the option to capture ProRes 2K in the 4:3 aspect ratio1, the format offers true anamorphic capture with regular 2:1 anamorphic lenses and offers extra room for repositioning when using standard spherical lenses. New for SUP 9.0 is the ability to shoot ProRes 4444 in Highspeed Mode.

ProRes 2K Image Aperture

When the ProRes recording resolution is switched from HD to 2K, the captured aperture changes from 2880 pixels / 23.76 mm / 0.935" width to 2868 pixels / 23.66 mm / 0.932" width. This allows the use of an optimized in-camera downscaler and provides the best possible 2K image output. When capturing ARRIRAW, it is common to use the full 2880 image width for processing a 2K deliverable. The ARRIRAW SDK, however, allows to process 2K images from both 2880 and 2868 pixels width to deliver an exact match to ProRes 2K footage when ARRIRAW was recorded in parallel with ProRes 2K[2].

[1] 4:3 ProRes 2K is available on ALEXA Plus 4:3, ALEXA Studio, ALEXA M, ALEXA XT, ALEXA XT Plus, ALEXA XT Studio and ALEXA XT M.

[2] This only applies to ALEXA cameras with the SxS Module. ARRIRAW T-Link output is not available in conjunction with the XR Module or on ALEXA XT cameras.

For more information on using ProRes 2K in different applications, please take a look at the "ProRes 2K in Editorial" white paper, available at www.arri.com/alexa/downloads.

Format	Sensor Mode	Resolution	Color Coding	Data Rate @ 24 fps [Mbit/s][1]	Data Volume @ 24 fps [GB/h][1]	fps Range[3 4]
ProRes 422 (Proxy)	4:3	2048 x 1536	10 bit YCbCr	60	27	0.75 – 48
	16:9	2048 x 1152	10 bit YCbCr	45	20	0.75 – 60
	16:9	1920 x 1080	10 bit YCbCr	40	18	0.75 – 120
ProRes 422 (LT)	4:3	2048 x 1536	10 bit YCbCr	130	63	0.75 – 48
	16:9	2048 x 1152	10 bit YCbCr	100	45	0.75 – 60
	16:9	1920 x 1080	10 bit YCbCr	90	40	0.75 – 120
ProRes 422	4:3	2048 x 1536	10 bit YCbCr	190	87	0.75 – 48
	16:9	2048 x 1152	10 bit YCbCr	140	65	0.75 – 60
	16:9	1920 x 1080	10 bit YCbCr	125	57	0.75 – 120
ProRes 422 (HQ)	4:3	2048 x 1536	10 bit YCbCr	280	130	0.75 – 48
	16:9	2048 x 1152	10 bit YCbCr	210	98	0.75 – 60
	16:9	1920 x 1080	10 bit YCbCr	185	85	0.75 – 120
ProRes 4444[2]	4:3	2048 x 1536	12 bit RGB	425	195	0.75 – 48
	16:9	2048 x 1152	12 bit RGB	320	146	0.75 – 60
	16:9	1920 x 1080	12 bit RGB	280	128	0.75 – 120

[1] ProRes is a variable bit rate codec. The actual data rate varies with the image content.
[2] ProRes 4444 provides an alpha channel, which is not used by the ALEXA.
[3] All speeds adjustable with 1/1000 fps precision.
[4] 2K ProRes recording is limited to 30fps on 32GB SxS Pro cards

Overview

DNxHD Recording

The ALEXA and ALEXA XT cameras allow in-camera recording of 1920 x 1080 (16:9) DNxHD encoded MXF files onto SxS PRO cards, CFast 2.0 cards[2] or XR Capture Drives[2]. With an installed DNxHD license, ALEXA users can choose between MXF/DNxHD or QuickTime/ProRes recording codecs. ALEXA's MXF/DNxHD material can be edited in Avid Media Composer Version 5.5 and later without transcoding.
The Material eXchange Format (MFX) is a core media container technology for nonlinear workflows. An MXF container file can "wrap" different types of video and audio material along with associated metadata. The internal structure of MXF files is defined by the so-called Operational Patterns. ALEXA cameras record DNxHD encoded images together with sound and embedded metadata in an MXF container file using the Operational Pattern 1a (OP1a) file structure. An Avid Media Composer does not need to transcode this material, as it already is available in a native DNxHD codec. The OP1a MXF format packages picture, sound and metadata in a single file. This is ideal for both camera acquisition and archiving since audio and video is always kept together and no data is lost if recording is interrupted for any reason.

To get more information about working with ALEXA DNxHD material, please take a look at the "MXF / DNxHD White Paper" which is available at www.arri.com/alexa/downloads.

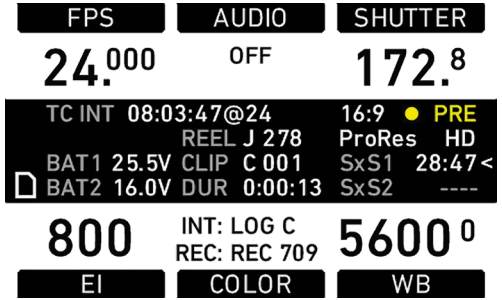
Format	Sensor Mode	Resolution	Color Coding	Data Rate @ 24 fps [Mbit/s]	Data Volume @ 24 fps [GB/h]	fps Range[1]
DNxHD 145	16:9	1920 x 1080	8 bit YCbCr	115	52	0.75 – 120
DNxHD 220x	16:9	1920 x 1080	10 bit YCbCr	175	79	0.75 – 120
DNxHD 444	16:9	1920 x 1080	10 bit RGB	350	159	0.75 – 96

[1] All speeds adjustable with 1/1000 fps precision
[2] CFast 2.0 cards can only be used on cameras with XR Module.

New recording features in SUP 9.0

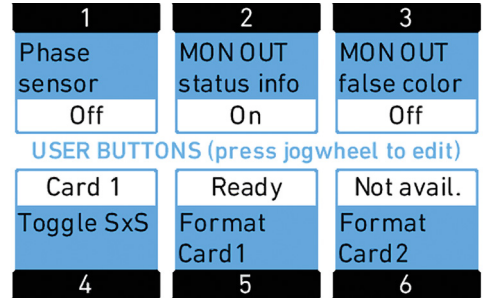
Pre-recording

This feature allows you to roll the camera before you press the REC button, so you won't miss the shot. With pre-recording enabled and active, the camera will continuously write frames into a ring buffer. As the actual take is started with a second press of the REC button, the camera keeps the content of the ring buffer and appends frames into a single clip, until the recording is stopped. Pre-recording is only available for ProRes codecs.



Phase-Button

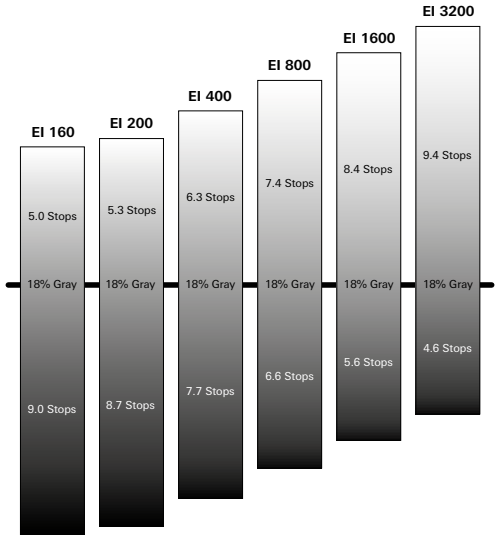
The new USER button function called "Phase sensor" increases the sensor frame rate by 0.2 fps for as long as the assigned user button is being pressed. When shooting e.g. a CRT monitor, you may see a horizontal black bar (video blanking interval) across the CRT screen in the EVF or the MON OUT image. It allows you to move that black bar out of the frame. The phase-function is only available in standby and with time code set to REC RUN.



Working with ALEXA

Exposure Index

While ALEXA's 14+ stops of exposure latitude and unique highlight handling approaches that of film, there is one major difference between the way film and digital cameras behave: with digital cameras, a change in EI will shift how many stops are available above and below 18% grey – each EI step shifts the location of 18% grey. What is special about ALEXA, however, is that its wide exposure latitude is available at all EI settings.



As a shortcut, we have come up with the following method of writing ALEXA's exposure index:

$EI\ 160^{+5.0}_{-9.0}$ $EI\ 200^{+5.3}_{-8.7}$ $EI\ 400^{+6.3}_{-7.7}$ $EI\ 800^{+7.4}_{-6.6}$ $EI\ 1600^{+8.4}_{-5.6}$ $EI\ 3200^{+9.4}_{-4.6}$

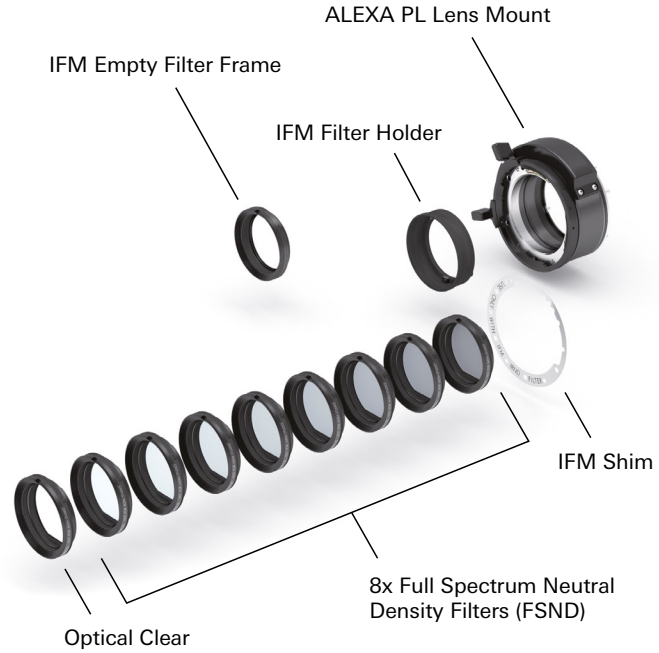
Values next to the exposure index are the number of stops above and below 18% grey. These values are for Log C. Rec 709 has 0.5 stops fewer in the low end at EI 160, 0.4 stops fewer in the low end at EI 200 and 0.2 stops fewer in the low end at EI 400. Otherwise they are the same.

Working with ND filters

While traditional ND filters work great for film, for digital cameras we recommend the use of ND filters that have a built-in far-red blocker. Traditional ND filters should only be used up to an ND 0.9. A single filter that combines a ND and a far-red cut off generally yields better results and fewer reflections than a traditional ND filter stacked on top of a separate IR-cut off filter.

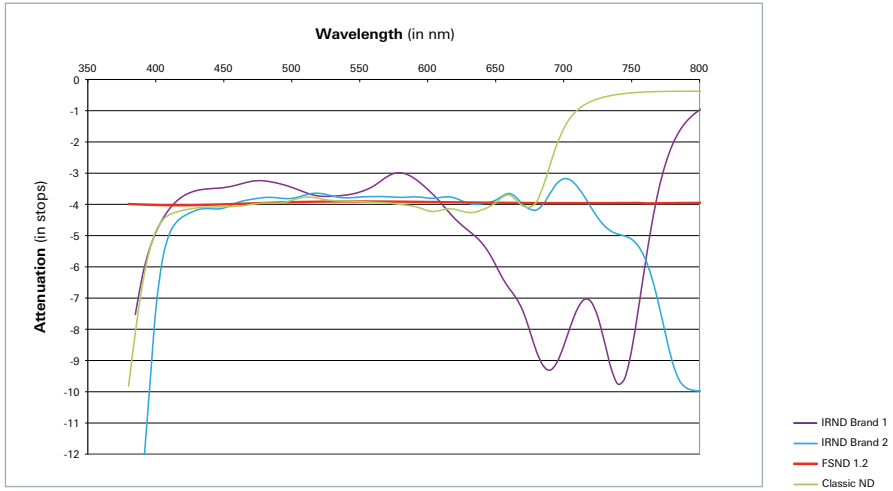
FSNDs & In-camera Filter Module (IFM-1)
With the launch of ALEXA XT a filter holder mechanism is available (preinstalled on ALEXA XT cameras except ALEXA XT Studio), that allows to work with a set of eight FSND (Full Spectrum Neutral Density) filters. In comparison to other IRNDs which have some bumps in their spectral behavior or the ordinary ND which opens up at about 675nm the FSNDs offer an even light attenuation across the whole spectrum (see next page).

The ALEXA Studio and ALEXA XT Studio have a built-in motorized ND with a density of ND 1.3 (4.3 stops), which can be moved in and out of the optical path. The advantage over classical ND filters is that it is located behind the mirror shutter, so the optical viewfinder image stays bright.



Working with ND filters cont.

FSNDs in comparison



False Color Exposure Check

The false color exposure check for the electronic viewfinder and/or MON OUT output measures the camera image, tints certain signal levels in a distinct color and shows the rest as a black-and-white image. The false color exposure check is based on the color processing set for the respective output signal path.

So if you have the viewfinder set to Rec 709, the false color exposure check will be based on the Rec 709 image. If you have the MON OUT at the same time set to Log C, the false color exposure check for MON OUT will be based on Log C.

Color	Level	Description
red	99 – 100%	White clipping
yellow	97 – 99%	Just below white clipping/white shoulder
pink	52 – 56%	One stop over medium gray (Caucasian skin)
green	38 – 42%	18% neutral gray
blue	2.5 – 4.0%	Just above black clipping/black slope
purple	0 – 2.5%	Black clipping

Color Spaces

The ALEXA or ALEXA XT can deliver the captured footage with "Video Rec 709" or "Log C ALEXA wide gamut" encoding.

Video - Rec 709
'Rec 709' is short for the International Telecommunication Union's ITU-R Recommendation BT.709 - the output format for a traditional television workflow. Since the Video - Rec 709 encoding from an ALEXA follows this standard for displaying images on video monitors, ALEXA Rec 709 images can be directly displayed on monitors or used for editing and dailies review. Without the need for color space conversion, ALEXA Rec 709 images can be processed by most HD video postproduction gear in real time. While providing somewhat reduced choices in color grading, Video - Rec 709 maintains ALEXA's wide exposure latitude, cinematic look and natural color rendition and offers the fastest workflow for any HD video-based infrastructure.

Color comparison: split image Video/Log C

Color Spaces cont.

Log C

The “C” in Log C is derived from “Cineon”. Cineon was the digital film scanning, processing and recording system developed by Kodak in the 90s. It is also the name of a file format that contains density data from scanned negative film. Density is a logarithmic measure of the opacity of the film. The relation of the density to the film’s exposure is called the characteristic curve of the film. Each stock has its own characteristic curve, but the overall shape is always the same.

ARRI introduced a scene based encoding for their camera data, which, because of the similarity to the Cineon standard, was named ‘Log C’. With Log C encoding, the signal level increases by a fixed amount with each increase of exposure measured in stops. This encoding gradually advanced with an initial implementation for the ARRIFLEX D-21 and then a few upgrades for the ALEXA. Log C images offer the original ALEXA-specific wide gamut color space and are ideal to carry image information.

Viewing and Monitoring Log C

Shooting images in Log C delivers the best basis for the colorist's work, as it provides the camera's full latitude in an unconfined color space. When viewed directly, Log C images look flat with desaturated colors. To correctly display Log C material on an HD monitor (Rec 709) or in a digital projection (P3), it needs to be tone-mapped and transformed into the target color space. This image conversion can be performed using a 3D Look Up Table (LUT).

When recording Log C or ARRIRAW, the MON OUT is typically set to display Rec 709 video. This activates an internal Log C to video conversion LUT on the output. The same applies if the REC OUT is used, for example, to present a clean video feed to the director. When an on-set color correction system is used to apply live looks to the camera image, the REC OUT is typically set to Log C output. The color corrector then applies the settings in Log C and converts the output to REC 709 video using a 3D LUT. ARRI provides these LUTs through the online ARRI LUT Generator at www.arri.com/alexa/tools.

Recording Codecs

Log C material is best recorded using a 4:4:4 codec (ProRes 4444 or DNxHD 444). The top quality 4:2:2 codecs (ProRes 422 (HQ) and DNxHD 220x) will also provide acceptable results in Log C, but due to the higher compression ratio, grading images recorded with these codecs may exhibit artifacts.

Linear

Visual effects often work with linear light encoded material. The ARRI LUT Generator can produce LUTs that will convert Log C material to sensor linear encoding. The linearization will preserve all image information. It is therefore possible to do round-trip conversions from Log C to linear and back to Log C.

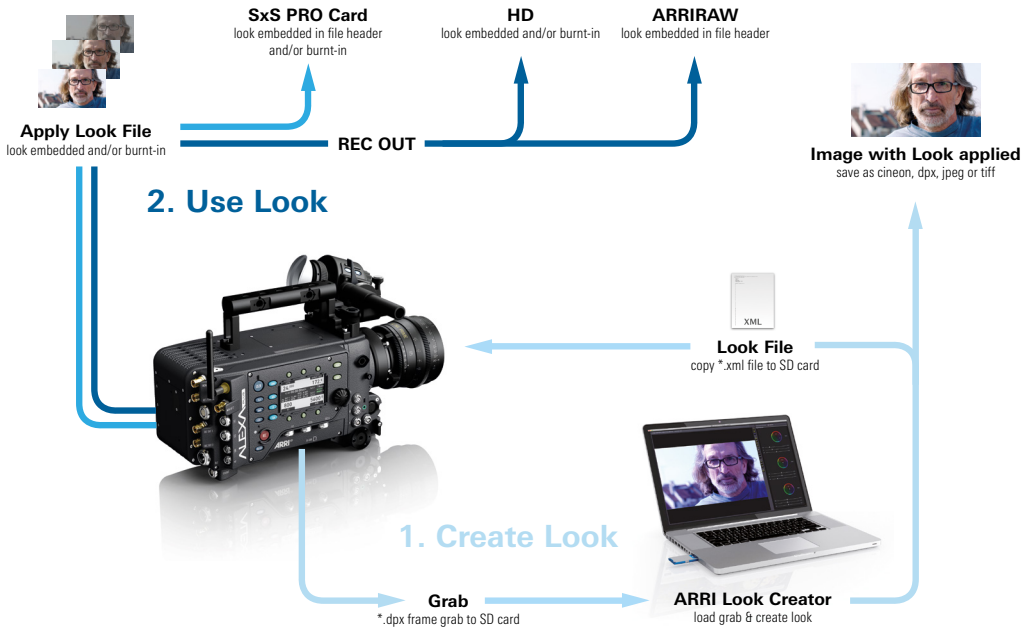
ARRI LUT Generator

The ARRI LUT Generator can output 1D and 3D LUTs for a wide range of common postproduction tools. It is available online at www.arri.com/alexa/tools.

Working with ALEXA

In-Camera Look Files

ARRI Look Files are editable XML files that can apply a customized look to all outputs (EVF-1, MON OUT, REC OUT, ProRes and/or DNxHD recording) that are set to Rec 709.
A look file can be created based on a Log C DPX grab or a Log C QuickTime clip that was stored by the camera. It contains parameters for saturation, printer lights controls (RGB offsets) and for lift/gamma/gain, similar to the CDL controls. Optionally, a look file may also include a freeform curve (grey scale tone map LUT) that will be applied instead of the standard Log C to Video tone mapping curve.
The free ARRI Look Creator (ALC) allows the creation of camera look files based on Log C DPX frame grabs. Looks can also be created with third party software Pomfort Silverstack SET and Colorfront On-Set Dailies.
ARRI Look Files can be saved to an SD card and imported into the camera. One Look File can be activated at a time and applied to the different image paths individually. It is possible, for instance, to record a clean Log C image onto the SxS PRO card while outputting a Rec 709 image with a look applied on the MON OUT output. As soon as a Look File gets applied to any output, the data of the Look File is stored in metadata.



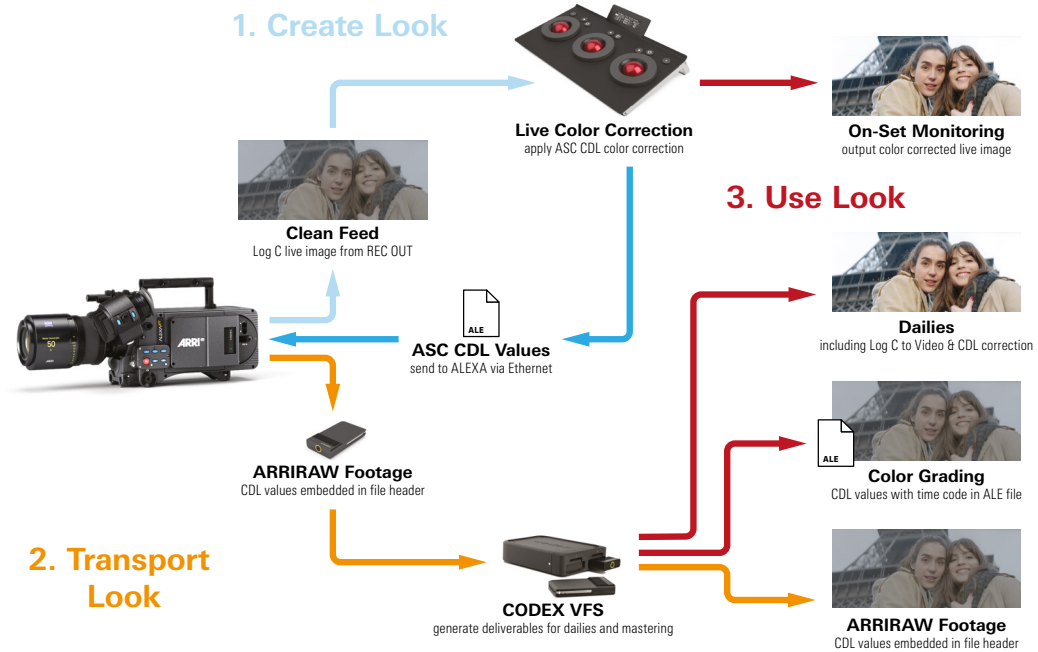
Non-Destructive Look Files

The Look File does not only go into ALEXA where it is embedded in the metadata/file header, but it is also used in the ARRI LUT Generator at http://www.arri.com/alexa/tools. The ARRI LUT Generator incorporates the Look File into a LUT. The LUT on the other hand is used e.g. in a color grading application where it serves as a reference point for the grading artist. In this way the director of photography's vision is being transported directly to post, where the actual 'development' of the images takes place.

ASC CDL Looks

The alternative to ARRIs in-camera look files is to send a clean Log C signal from the camera's REC OUT to an on-set color correction tool, such as FilmLight Truelight, Technicolor DP Lights or Pomfort Live Grade, and apply an ASC CDL (American Society of Cinematographers Color Decision List) color correction to the live camera feed for monitoring. The ASC CDL standard is supported by a wide range of devices. Color correction settings that were made during the shoot are logged with time code and can be output in an Avid Log Exchange (ALE) file.

The ALE file then can then be used in a color correction system to automatically apply the color corrections when deliverables will be created. ALEXAs with an XR Module and Codex Onboard recorders can be connected to any color corrector offering the Truelight CDL Protocol via Ethernet and automatically capture the ASC CDL correction values with the camera footage. The Codex VFS can use the color correction settings and automatically apply them when generating files. On ALEXA XT/XR cameras, the CDL values will be embedded within the header of each ARRIRAW frame.



Legal and Extended Range

A 10 bit legal range signal uses digital code values 64 to 940 to represent the camera's full contrast range from black to white. In an extended range signal, the same range is represented by code values 4 to 1019. Extended range encoding does not provide a higher dynamic range, nor does legal range encoding limit the dynamic range that can be captured. It is only the quantization (the number of lightness steps between the darkest and brightest image parts) that is slightly increased (about 0.2 bits). The same applies for 8 bit (0-256 range) or 12 bit (0-4096 range) signals.

An ALEXA always records ProRes and DNxHD clips using legal range encoding, as required by the codec specifications. Most editing or post production tools automatically transform the legal range files to e.g. computer graphics RGB full range (0-1024) for display.
Note: Some recorders will allow to record e.g. ProRes clips in extended range. If this material is brought into FCP, for example, the application displays values outside the legal range as “superblack” and “superwhite”, but as soon as an RGB filter layer is applied, those values are clipped.

p and psf

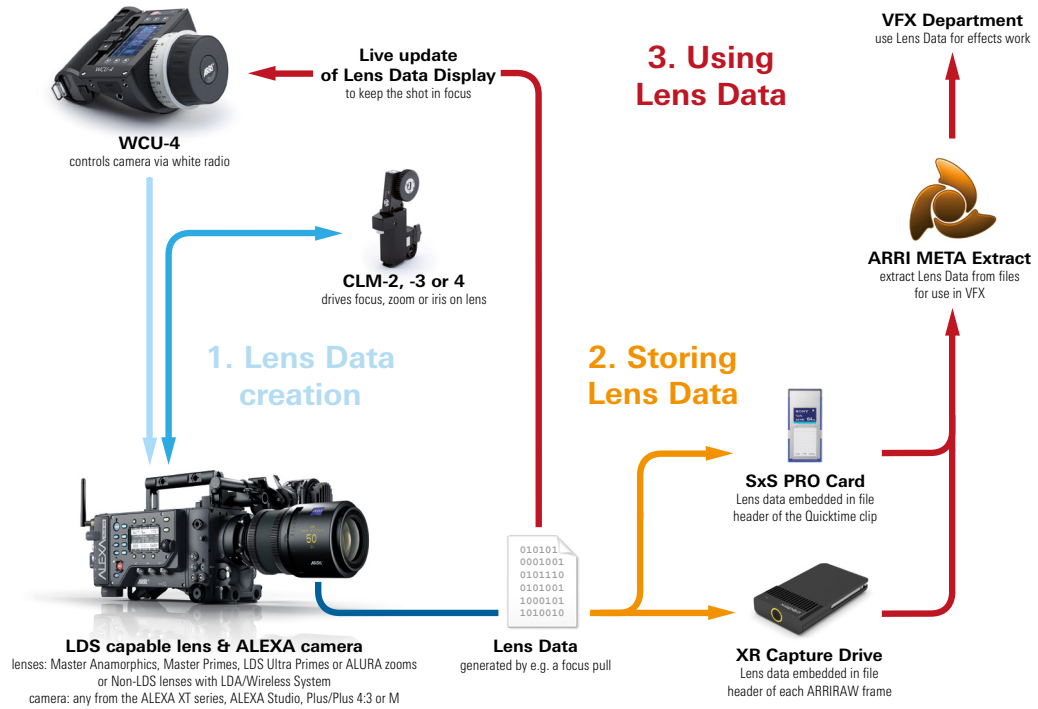
The REC OUT and MON OUT on an ALEXA can be set progressive (p) or progressive segmented frames (psf) output. An ALEXA always captures progressively (full frame at once). The psf mode splits each frame into two segments other than interlaced capture, which captures both segments in two separate exposures. The psf output enables compatibility to devices that only understand interlaced signals for certain frame rates. It has no influence on the internal recording or ARRIRAW T-Link output.

Metadata Overview

Metadata is a set of data that describes and gives information about other data. ALEXA and ALEXA XT always records as much metadata as is available. This additional information makes documentation easier as the metadata is stored within the image files so it cannot get lost.
A range of automatic and human-readable data is being delivered by the ALEXA camera; this data makes work in post much easier: exposure index, gamma and white balance information, for example, is essential for creating dailies or color grading. Reel number, project fps, date and time become important when combining images and sound from different sources. Metadata in the ALEXA appears in several different ways: embedded in the ARRIRAW header, QuickTime metadata atom and ARRI Digital Meta Data (ADMD) atom, MXF metadata XML, Final Cut Pro 7 XML and Avid Log Exchange (ALE) file. These atoms or text based files can be parsed by e.g. editing software and offer the accompanying information mentioned above to the application and its user.

For more information on the metadata have a look at our whitepaper at www.arri.com/alexa/downloads.

Lens Data System
By combining the ALEXA XT Series, ALEXA Plus, ALEXA M or ALEXA Studio camera with lenses equipped with a Lens Data System (LDS) PL-Mount additional frame by frame lens metadata for use in VFX work will be acquired. When using a non-LDS lens in combination with the ARRI Controlled Lens Motors a profile for the lens can be created within the Lens Data Archive (LDA); by doing so the ALEXA camera can compensate for the missing sensors inside the lens by reading the motor's position and calculating the current focus, iris or zoom value. A guide on how to create an entry for an unknown lens can be found on page 62.


WCU-4
controls camera via white radio
Live update
of Lens Data Display
to keep the shot in focus
CLM-2, -3 or 4
drives focus, zoom or iris on lens
1. Lens Data
creation
LDS capable lens & ALEXA camera
lenses: Master Anamorphics, Master Primes, LDS Ultra Primes or ALURA zooms
or Non-LDS lenses with LDA/Wireless System
camera: any from the ALEXA XT series, ALEXA Studio, Plus/Plus 4:3 or M
Lens Data
generated by e.g. a focus pull
2. Storing
Lens Data
SxS PRO Card
Lens data embedded in file
header of the Quicktime clip
XR Capture Drive
Lens data embedded in file
header of each ARRIRAW frame
3. Using
Lens Data
ARRI META Extract
extract Lens Data from files
for use in VFX
VFX Department
use Lens Data for effects work

Licenses

Licensed features expand the capabilities of an ALEXA camera. A license file is serial number sensitive and can only be used on the camera for which it has been purchased. Currently there are three licenses available: Anamorphic De-squeeze, High Speed and DNxHD Recording.

- Anamorphic De-squeeze shows a properly de-squeezed image (with or without surround view) on EVF-1 and/or MON OUT when working with 1.3x or 2x anamorphic lenses.

- The High Speed license allows recording 60 to 120 fps in 16:9 HD with ProRes codecs up to ProRes 422 HQ or with DNxHD codec up to DNxHD 220x onto SxS PRO 64 GB cards. This mode uses the same Super 35 sensor area as Regular Speed mode (same depth of field, same angle of view). ARRIRAW, 2K SxS resolution, ProRes 4444 and 4:3 sensor mode are not supported in High Speed mode; REC OUT will be rerouted to clone MON OUT.

- The DNxHD license allows in-camera recording onto SxS PRO cards of 16:9 HD Avid DNxHD 145 (8 bit 4:2:2), DNxHD 220x (10 bit 4:2:2) and DNxHD 444 (10bit 4:4:4) codecs, both within a MXF wrapper and embedded audio, timecode and metadata. ALEXA MXF/DNxHD files use operational pattern OP1a, frame wrapped, per SMPTE 2019-4-2008 and a MXF (Media eXchange Format) container (compared to the Quicktime “mov” container). MXF/DNxHD files can be linked to Avid Media Composer 5.5 or greater using the ALEXA AMA plug-in (available from the ARRI website for Windows or Mac OS X). Of course DNxHD recording is available in Regular and in High Speed mode (see High Speed license).

- On ALEXA XT the High Speed and Anamorphic De-squeeze licenses are preinstalled.

ALEXA Preshoot Checklist

General considerations

This chapter offers checklists for typical use-cases of an ALEXA or ALEXA XT camera. During prep or pre-production, the following topics should be clear:

The basic camera parameters (e.g. timecode basis respectively project speed, choice of gamma and recording format) should always be discussed with postproduction. The choice of camera settings can be affected for different reasons. Sometimes the reasons are creative, sometimes the production pace may have an influence.

To avoid surprises, it is critical to give the planned setup a try and run a short test through the entire workflow before starting the shoot; This is the fastest and most reliable way to identify problems in the digital workflow.

We highly recommend that you make at least one verified backup immediately after the recording media is removed from the camera. We also recommend that a first quality control should ideally happen on location. With digitally captured footage being viewable immediately after recording, potential problems can be spotted right away and re-shooting a scene will be less of a problem. Also check the conditions of your completion bond; it is not unusual that LTO backups are a mandatory requirement for the footage to be covered.

Recording with the XR or SxS Module

Camera Setup
The following steps are necessary to prep the camera for recording.

1. Start your initial camera setup by pressing **[MENU]**, going to **User Setups > Factory reset** and press **both soft buttons** to confirm.
   Note that ARRI Look Files and Custom Frame lines need to be uploaded again after a factory reset.
2. Enter the **[PROJECT]** screen using the shortcut on the bottom right.
   - Select a **sensor mode** to shoot in 16:9 or 4:3 aspect ratio.
   - Pick a **recording resolution** and **codec** or switch to ARRIRAW recording.
   - Set the **project frame rate**, which also acts as timecode base and playback frame rate.
   - Assign an individual **camera index** when shooting with more than one camera unit.
   - **Next reel count** usually starts with 001 and automatically increments when the camera starts recording to a new card or drive.
3. Press **[TC]** and enter the timecode **[OPTIONS]**. Assuming we'll get timecode from the Production Sound Mixer:
   - Set **Source** to **Ext LTC** and verify that
   - **Mode** is set to **Free Run** and
   - **Generator** is set to **Jam Sync**.
4. Press **[HOME]** and go to the **FPS** screen.
   - Enter **[SDI FPS]** and adapt **REC OUT** and **MON OUT** to the project frame rate.
   - Go **[BACK]**, select the **SENSOR FPS** from the list and enter by clicking the menu wheel.

Recording with the XR or SxS Module cont.

5. Back on the Home screen, enter **[COLOR] > [GAMMA]**, set **INTERNAL** to **LOG C** (not used for ARRIRAW) and everything else to **REC 709**.

From the HOME screen, adjust **[EI]**, **[SHUTTER]**, and **[WB]** as required.

Frequently used functions should be assigned to user buttons. Press **USER button** and enter the **EDIT** screen.

- Buttons 1 to 3 are available on the assistant and operator side, so it makes sense to assign functions that are useful on both sides, like **EVF Gamma**, **MON OUT false color**, **MON OUT peaking** or **Check last clip**.
- Buttons 4 to 6 are only available on the assistant side through the user screen.

Additional notes for shooting in other modes than the standard setup

Shooting Highspeed

- When shooting at 60 to 120 fps, the **project frame rate** determines how many of the recorded frames will make up one second in playback (timecode base).
- **[TC]** should be set to **Int LTC** and **Rec Run** (Step 3).
- Switch to **[High Speed]** from the FPS screen (Step 4).

Recording ARRIRAW via T-Link (not available on ALEXA XT cameras)

- Unless you want to record ARRIRAW and e.g. ProRes in parallel, the **Codec** setting can also be used to turn off the SxS Module (Step 2).

This will output a record flag (to start external recorders automatically) even if no SxS card is present in the camera.

- Go to **[MENU] > Recording > REC OUT** and set the **HD-SDI format** to **ARRIRAW 1.5G DL** or **3G SL** for normal speed or **3G DL** for high speed (up to 60fps) ARRIRAW output.
- Optionally, turn on **REC OUT fps sets sensor fps**.
- Turn **SDI remote on**.

Please check the user manual of the recorder for setup instructions. Operating the recording hardware needs to be taken very seriously. Only trained personnel should be responsible for handling recording equipment.

Additional notes for shooting in other modes than the standard setup cont.

XR Capture Drive/SxS PRO card Rotation

1. Take a fresh drive/card, make sure it is not locked (SxS only) and insert it into the camera. Label facing to the outside.
2. If the drive/card has been used before and still contains footage:
   - › First **verify that the material has been properly transferred**.
   - › Then use **MENU > Recording > Internal > Quick format media** to format/empty the card for recording.
   - › Ask the data wrangler to empty the drives/cards before returning them to you.
3. Don't wait for a drive/card to fill up completely.
4. Remove the mag and prepare it to be backed up.
   - › Put the drive/card into its case.
   - › Visually mark the "exposed negative" with colored tape.
5. The data wrangler should perform at least the following steps:
   - › Transfer the drive's/card's contents including **checksum verification**.
   - › Depending on the recording mode, format the drive/card (ProRes/DNxHD) or clear the drive (ARRIRAW) before it is returned to the camera. This greatly reduces risk to accidently format a drive/card that has not been backed up and made it back to the camera by mistake.
   - › Put the drive/card back into its case without color tape and hand over to the loader.

Shooting Stereo 3D

1. Do not use different ALEXA models in a 3D setup. If a licensed feature will be used, the license key must be installed on both cameras.
2. Connect both cameras using the **EXT to EXT** and **Ethernet to Ethernet** cable.
3. Start the initial camera setup with a **Factory reset** on both cameras and skip the **Project** settings.
4. Enter **[MENU] > SYSTEM > External Sync**.
   - › Set the **Eye index** for each camera depending on their position.
   - › Set **Sensor sync** to **EXT master** on one camera and **EXT slave** on the other.
   - › Set **Settings sync** to **ETH master** on one camera and **EXR slave** on the other. All settings made on one camera will now automatically be set on the other.
5. Now return to **[MENU] > Project** and proceed from Step 2 in the regular camera setup.

Note: The camera that can be seen better in the 3D rig should be set to **EXT/ ETH slave** as only the slave camera indicates a missing sync between master and slave before recording.

ALEXA M/ALEXA XT M fiber maintenance

The cleanliness of the optical fiber connectors is mandatory for seamless functionality. Make sure not to touch the white fiber ends. Never leave the connectors open but cover them with their rubber covers when not in use. Plug the fiber end covers together while using the fiber cable, to prevent dirt from accumulating inside the cover. Regularly check the cleanliness of the fiber end, e.g. with a fiber microscope. If dirty, clean the fiber end with the appropriate tools, such as the SMPTE cleaning pen (K2.72082.0).

Creating Lens Tables

The ARRI Lens Data System (LDS) provides frame-accurate information about the focus, iris, and zoom settings of a lens at the time of shooting. ALEXA cameras can embed this information with the images, or send it to peripheral camera equipment on set.
Embedded lens data is very helpful for VFX post-production, as it eliminates paper and guesswork. On set, the same data can be used with the WCU-4 hand unit's integrated lens data display and pre-marked focus rings for more accurate focus pulls and faster lens setups.

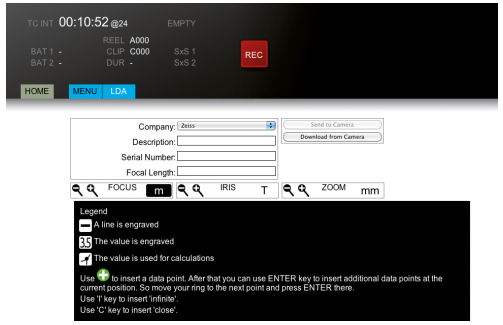
ARRI LDS lenses such as Master Anamorphics, Master Primes, LDS Ultra Primes, ALURA Lightweight Zooms and the Ultra Wide Zoom deliver lens data instantly, as they have integrated encoders that determine the current lens position, as well as a lens table that interprets those encoder values. The same applies to Cooke /i lenses.
All other lenses require an external encoder and a custom lens table for lens data generation. All ARRI CLM motors include an accurate encoder that can determine the lens position. Custom lens tables can be generated with the ALEXA Webremote interface. This document explains how to create and manage custom lens files with an ALEXA Plus or Studio type camera.

Required Equipment

- An ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio, ALEXA XT Plus or ALEXA XT Studio.
- One or more lens motors (CLM-2, CLM-3 or CLM-4). We recommend using one motor per lens scale. If you have only one motor available but need to add more than one lens axis, you can create the lens scales sequentially, connecting the motor to the respective controller connector. Data points do not get lost unless the web browser's session cookie is deleted.
- One lens control hand unit (e.g. WCU-4). Alternatively, lens rings can also be moved manually with the motor attached to the lens. motor attached to the lens.
- A computer with installed web browser (e.g. Firefox, Chrome, Safari). Cookies must be enabled. Internet Explorer and Opera browsers are NOT supported!
- An ALEXA Ethernet/RJ-45 Cable KC 153-S (K2.72021.0)

Creating a Lens Table

1. A prerequisite for lens table programming is the correct setup of the lens motors. Please set up the correct motor direction. If you mount the motor on the camera right side (ALEXA's display side), set DIRECTION to RIGHT. If you mount a motor on the left side, set DIRECTION to LEFT. Then calibrate the lens motors by pressing the **CAL. ALL** button.
   Each ALEXA camera comes with an built-in basic remote control web interface that can be accessed through an ethernet connection using the Bonjour protocol. Part of this web interface is the 'LDA' (Lens Data Archive) tab that allows creation and storage of new lens tables to the ALEXA camera.
2. Connect the camera to a computer
3. Open the web browser on the computer and enter the address alexa####.local, with #### being the serial number of the camera.
4. Open the 'LDA' tab in the ALEXA web browser.



A manual is available for download.

5. Enter the LDA tab and click the button **Start new session**. A browser screen with lens scales comes up. If you did not yet **calibrate** the lens motors, you can do so by hitting the Calibrate button on screen. The same applies if you are using one motor sequentially for multiple lens axes.
   The lens scales are displayed on the LDA browser screen once the respective motors have been calibrated. The green + symbol indicates the current position of the motor attached to the lens.
6. Fill in the lens descriptive fields. Lens descriptions will be shown on LDS screens or embedded as metadata:
   - **Company:** The lens manufacturer. Will not be embedded as metadata.
   - **Description:** Lens description that will be displayed in the camera and WCU-4 screen and embedded as metadata. Lens type, focal length and serial number.
   - **Serial Number:** Lens serial number will be embedded as metadata.
   - **Focal Length:** Focal length in mm. Will be shown on LDS screens and embedded as metadata. Enter '0' (zero) for zoom lenses.
7. First, select the unit of measurement (metric or imperial) by clicking on the **ft/m** icon in the upper right corner of the focus scale. If you want to program the lens for both metric and imperial units, you need to program both scales sequentially.
8. Move lens ring to the physical engraving that you want to add as a new data point. Click on the green '+' in the LDA browser scale or hit the 'Enter' button on your keyboard to open the active edit field.
9. Enter the current lens value.
10. Move the lens ring to the next position to enter the next data point.

Creating a Lens Table cont.

Data Point Options:
Each data point can have up to three characteristics that have effects on display and interpolation of the lens table. Inactivated options are displayed in grey color and crossed out.

- Data point will be indicated with a marking line.
- Data point will be indicated with a number.
- Data point will be used for interpolation.

Imperial Scales:
Enter feet values by using the prime symbol (') and enter inch values by using the double prime symbol (''). The prime symbol for feet values can be used to separate feet and inch values, e.g.

21 inches:	1'9 or 21''
14.5 inches:	1'2.5 or 14.5''
20 feet:	20'

Metric Scales:
Enter metric values as meters, e.g.

80 centimeters:	0.8
5.5 meters:	5.5
30 meters:	30

Infinity Point:
Enter 'i' to set the infinity point.

Creating Lens Tables

Creating a Lens Table cont.

Recommended Practice:
All three options are usually active with focus scales. However, there are sometimes just the engraved marking lines without any number in the close focus area. If you are unsure about the numerical value of such a mark, you can switch off the usage for interpolation of this data point. You might want to switch off marking lines for zoom values, if the lens does not have those lines as well. Intermediate iris steps can be programmed with a marking line only, without a number and without being used for interpolation.

Editing and Deleting Data Points
Existing data points can be moved on the lens scale by using the 'Snap' function. Hitting the Snap button underneath each lens scale will move the nearest data point to the current motor position. This can be particularly useful if an existing lens scale has a slight offset and needs adjustment.
A data point can be deleted by moving the point to the screen scale index. Once there, the icon changes from the green + symbol to a red - symbol and can be deleted by clicking on the red - symbol or pressing ENTER on the keyboard.
Click the Clear Scale button to delete all data points on the respective scale.

Saving and Downloading Lens Tables
You can save a newly created lens table into the camera's internal Lens Data Archive (LDA) by clicking the Send to Camera button. The lens file will then be processed and stored inside the ALEXA LDA User Archive section.
The Webremote will prompt an error message in case of any logical data errors within the lens file. In such a case, please check the data consistency of the lens values in the LDA browser and correct them.

Click Download from Camera to download any existing lens table from the ALEXA LDA User Archive to the computer. Save them onto an SD card if you want to load them into another camera from the SD card (SD card folder: ARRI/ALEXA/LDA).

For more information on the LDS, LDA or lens table creation have a look at our Programming Quick-Guide at www.arri.com/camera/digital_cameras/downloads/.

ALEXA XT/XR Workflows

The XR Capture Drive is formatted differently for uncompressed ARRIRAW and compressed ProRes/DNxHD recording.

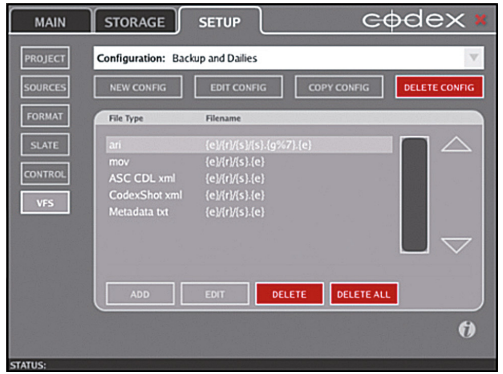
Compressed Recording Formats

When the XR Module is set to ProRes 2K/HD or DNxHD recording, the drives are initialized like SxS PRO cards, as a UDF volume. This provides 240 GB storage capacity which equals over 100 minutes of 16:9 ProRes 4444 in 2K at 24 fps. Using the UDF file system maintains an overall compatibility to the established ALEXA ProRes/DNxHD workflows. Capture Drives or SxS PRO cards containing ProRes 2K/HD or DNxHD material can be accessed directly with the file names and directory structure in the known order.

The most affordable solution to access Capture Drives is the Single Dock, a USB-3 Dock that will hold one drive.

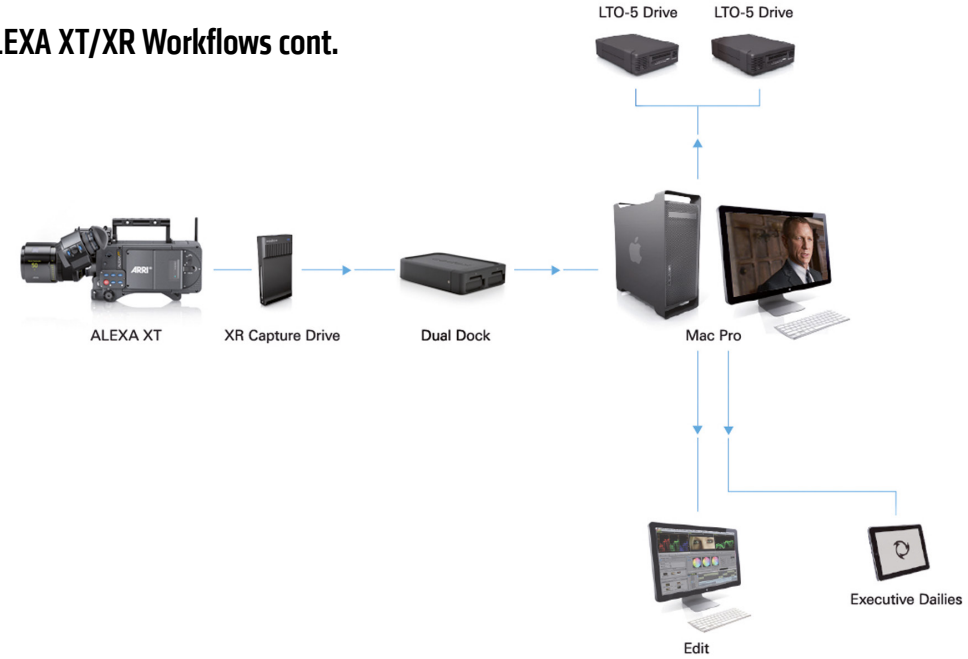
Uncompressed ARRIRAW

When the camera records ARRIRAW, the Capture Drives are initialized for use with the Codex Virtual File System, which provides 480 GB of storage capacity, or about 45 minutes of 16:9 ARRIRAW 2.8K. These drives can be accessed using a Single Dock, or preferably the more powerful Dual Dock (2 drive bays and faster SAS connection) using a Codex software running on a Mac. Codex also offers a standalone turnkey system called Vault for assisted location-based data management.



When a Capture Drive with footage is loaded, the contents are presented through the Codex Virtual File System (VFS). The VFS can present various file formats, such as readily processed DPX files and Avid DNxHD proxies next to the original ARI files on drive. Except for the recorded data, however, none of these additional files actually exist. It's only when these files are requested, that they are generated, on-demand and on the fly. Hence the term "virtual". The file formats, file naming and directory structure that will be presented by the VFS are fully configurable through the Codex software. This makes the VFS a highly flexible tool for providing exactly the material you require, when you want it, without redundant processing and storage overhead on your drives.

ALEXA XT/XR Workflows cont.



Generating Deliverables

Functions:

- Clone Capture Drives to transfer drives, maintaining the VFS
- Checksum verification
- Generate files for review, edit and post
- Clear the data from the recording media

Optional Features:

- Codex Storage option, to keep footage in VFS for several days before clearing
- Codex Offloader option, for verified copies to external drives or LTFS tape

A "digital lab setup" as shown here can be used to handle all regular data management tasks during a production.

- *.ARI files are backed up to an internal or external RAID (and collected for archiving to LTO tape). Depending on the amount of footage per day, 5 TB of storage provides enough space for a few shoot days worth of ARRIRAW footage. This gives a production a few days buffer to confirm that the material is OK before the storage needs to be cleared.
- Deliverables for Dailies review and editorial can be provided via Network or shuttle disks.

ALEXA XT/XR Workflows

ALEXA XT/XR Workflows cont.

This setup also offers several options to optimize the performance in different production environments:

- The Dual Dock allows cloning Capture Drives to Codex Transfer Drives. Cloning creates verified, identical copies and maintains the VFS.
- An optional Codex Storage option will transform up to 6TB of internal RAID storage into a Codex volume, which allows cloning Capture Drives to keep all data in the VFS.
- Setting up the Mac in a 10 Gig Ethernet network enables direct VFS access for postproduction tools through a network share.
- The optional Codex Offloader option expands the Software with an option to create verified copies of the VFS to connected external disks or to LTO tapes for archiving.

Scaling your Workflow

To overcome a situation where you will be faced with more footage than a setup can handle, the obvious solution is to add a second setup. Sometimes, it may be more beneficial to combine setups including a Single Dock and a Dual Dock or a Dual Dock and a Vault, and to use the different feature-sets to distribute the workload.
Sometimes (not even related to the amount of footage) higher efficiency may be gained by splitting tasks between location and post production. One example would be creating multiple deliverables for editorial, dailies projection, streaming on the web, iPad, etc., which can be done more efficiently using a dedicated dailies tool. Archiving to LTO tape also does not necessarily need to happen on location, especially if postproduction is close by and possibly connected over e.g. 10 Gig Ethernet.

Specifications and Reference

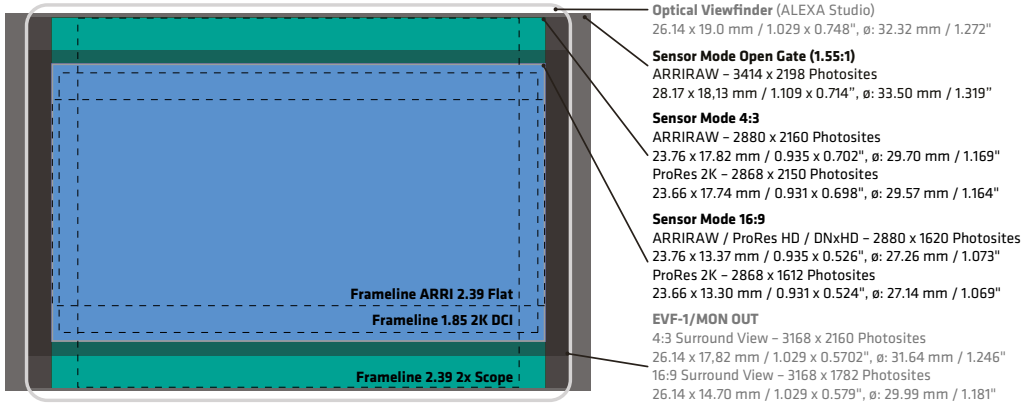
Technical Specifications

Camera Types:

ALEXA	35 format film-style digital camera with integrated shoulder arch and receptacles for 15 mm lightweight rods.
ALEXA XT	35 format film-style digital camera with integrated shoulder arch and receptacles for 15 mm lightweight rods. The ALEXA XT Series features a 4:3 sensor as well as various improvements including a Lens Data Mount for all cameras.
ALEXA Plus	Offers in addition built-in support for the ARRI Wireless Remote System, cmotion cvolution lens control system and ARRI Lens Data System (including Lens Data Mount and Lens Data Archive for lenses without built-in LDS).
ALEXA Plus 4:3	This version of ALEXA Plus offers a 4:3 capture mode in addition to the "Plus" feature set. It is bundled with Anamorphic Desqueeze, Highspeed and DNxHD license.
ALEXA XT Plus	Offers in addition built-in support for the ARRI Wireless Remote System and cmotion cvolution lens control system.
ALEXA Studio	In addition features a rotating mirror shutter, an optical viewfinder that can be exchanged with the standard electronic viewfinder and 4:3 capture mode.
ALEXA XT Studio	In addition features a rotating mirror shutter, an optical viewfinder that can be exchanged with the standard electronic viewfinder.
ALEXA M	Based on the ALEXA, but with separate camera head and body. Also offers 4:3 capture mode.
ALEXA XT M	Based on the ALEXA, but with separate camera head (equipped with LDS PL mount) and body.

Specifications and Reference

Output Formats in 16:9, 4:3 and Open Gate Sensor Mode


Optical Viewfinder (ALEXA Studio)
26.14 x 19.0 mm / 1.029 x 0.748", ø: 32.32 mm / 1.272"
Sensor Mode Open Gate (1.55:1)
ARRIRAW – 3414 x 2198 Photosites
28.17 x 18,13 mm / 1.109 x 0.714", ø: 33.50 mm / 1.319"
Sensor Mode 4:3
ARRIRAW – 2880 x 2160 Photosites
23.76 x 17.82 mm / 0.935 x 0.702", ø: 29.70 mm / 1.169"
ProRes 2K – 2868 x 2150 Photosites
23.66 x 17.74 mm / 0.931 x 0.698", ø: 29.57 mm / 1.164"
Sensor Mode 16:9
ARRIRAW / ProRes HD / DNxHD – 2880 x 1620 Photosites
23.76 x 13.37 mm / 0.935 x 0.526", ø: 27.26 mm / 1.073"
ProRes 2K – 2868 x 1612 Photosites
23.66 x 13.30 mm / 0.931 x 0.524", ø: 27.14 mm / 1.069"
EVF-1/MON OUT
4:3 Surround View – 3168 x 2160 Photosites
26.14 x 17,82 mm / 1.029 x 0.5702", ø: 31.64 mm / 1.246"
16:9 Surround View – 3168 x 1782 Photosites
26.14 x 14.70 mm / 1.029 x 0.579", ø: 29.99 mm / 1.181"
Frameline ARRI 2.39 Flat
Frameline 1.85 2K DCI
Frameline 2.39 2x Scope

Sensor

35 format ALEV III CMOS sensor with Dual Gain Architecture (DGA) and Bayer pattern color filter array.

Resolution

16:9 sensor mode: **2880 x 1620 pixels for ARRIRAW and HD recording formats**
2868 x 1612 pixels for ProRes 2K recording

4:3 sensor mode: **2880 x 2160 pixels for ARRIRAW recording**
2868 x 2150 pixels for ProRes 2K recording

Open Gate sensor mode: **3414 x 2198 pixels for ARRIRAW recording**

Operating Modes

Sensor mode 16:9, 4:3 or Open Gate. Switching takes approx. 60 seconds. 4:3 output only available for ARRIRAW and ProRes 2K recording; Open Gate only available for ARRIRAW recording on ALEXA XT cameras

Regular or **High Speed mode.** Switching takes approximately 40 seconds. High Speed mode is available for 16:9 sensor mode only.

Mirror shutter (ALEXA Studio only) on or off. Switching takes approximately 3 seconds through camera display.

Motorized Filter (ALEXA Studio/ ALEXA XT Studio only)

Sealed behind-the-lens motorized filter mechanism provides optical flat or ND 1.3 (4 1/3 stops).

Frame Rates

Please refer to the tables given in the chapter “Recording Media” on page 16 ff.

Shutter

Rotating mirror shutter (ALEXA Studio only) (11.2° - 180.0°) or electronic rolling shutter (0.75 - 60 fps: 5.0° - 358.0°; 60 - 120 fps: 356°). Shutter angle setting precision: 1/10 degree. Certain fps limits apply for maximum mirror shutter angle.

Exposure Latitude

14 stops for all sensitivity settings from EI 160 to EI 3200, as measured with the ARRI Dynamic Range Test Chart (DRTC).

Exposure Index

EI $160^{+5.0}_{-9.0}$ EI $200^{+5.3}_{-8.7}$ EI $400^{+6.3}_{-7.7}$ EI $800^{+7.4}_{-6.6}$ EI $1600^{+8.4}_{-5.6}$ EI $3200^{+9.4}_{-4.6}$

Values behind the exposure index are the number of available stops above and below 18% grey. These values apply to Log C output. Rec 709 output provides 0.5 stops less on the low end at EI 160, 0.4 stops less on the low end at EI 200 and 0.2 stops less on the low end at EI 400.

White Balance

Separate red/blue and green/magenta balance available through Auto White Balance or manual setting. Red/blue: 2000 to 11000 Kelvin, adjustable in 100 K steps, with presets of 3200 (tungsten), 4300 (fluorescent), 5600 (daylight), 7000 (daylight cool). Green/magenta: -8 to +8 color correction (CC), 1 CC = 035 Kodak CC values or 1/8 Rosco values.

Sound Level

ALEXA: Under 20 db(A) @ 24 fps (mirror shutter running on the Studio) and ≤ +30° Celsius (≤ +86° Fahrenheit) with lens attached and fan mode set to 'Regular', measured 1 m/3 feet in front of the lens. Silent operation at higher temperatures possible with fan mode set to 'Rec low'.
ALEXA XT: Under 19 db(A) @ 24 fps (mirror shutter running on the Studio) and ≤ +30° Celsius (≤ +86° Fahrenheit) with lens attached and fan mode set to 'Regular', measured 1 m/3 feet in front of the lens. Silent operation at higher temperatures possible with fan mode set to 'Rec low'.

Power In

BAT connector, optional V-Lock or Gold mount battery adapter back and top. Camera accepts 10.5 to 34 V DC on all inputs.

Power draw

ALEXA/Plus/Plus 4:3: 85 W for camera and EVF-1, recording to SxS PRO cards.
ALEXA XT/XT Plus: 100W for camera and EVF-1, recording to Capture Drives/SxS PRO cards.

ALEXA Studio: 90 W for camera with OVF-1, recording to SxS PRO cards, mirror shutter on.
ALEXA XT Studio: 105 W for camera with OVF-1, recording to Capture Drives/SxS PRO cards, mirror shutter on.
When running over 30 fps with mirror shutter on, a supply voltage of 18 V or more is recommended.

ALEXA M: 40 W for camera head and 85 W for body, recording to SxS PRO cards.
ALEXA XT M: 40 W for camera head and 100 W for body, recording to Capture Drives/SxS PRO cards.
A 24 V power input to the body is required to power the camera head from the body through a standard SMPTE hybrid cable up to 50 meters, without accessories. The camera head has one 10.5 to 34 V DC power input that can be used to power the head independently form the camera body.

Power Out

12 V connector: limited to 12 V, up to 2.2 A.
RS, EXT and **ETHERNET**: input below 24 V is regulated up to 24 V, above 24 V: input = output voltage. Both RS and EXT connectors combined: up to 2.2 A.
ETHERNET: up to 1.2 A. Maximum power draw is also limited by the power source.
The camera head on the ALEXA M offers two RS connectors and one ETHERNET connector, with the same specifics as on the camera body.

Weight

Camera Model	Camera Body	With Accessories[1]
ALEXA with SxS Module	6.3 kg/13.8 lb	7.7 kg/16.9 lb
ALEXA XT with XR Module	6.6 kg/14.5 lb	8.0 kg/17.6 lb
ALEXA Plus/Plus 4:3 with SxS Module	7.0 kg/15.4 lb	8.4 kg/18.5 lb
ALEXA XT Plus with XR Module	7.3 kg/16.1 lb	8.7 kg/19.2 lb
ALEXA Studio with SxS Module[2]	8.0 kg/17.6 lb	10.2 kg/22.5 lb
ALEXA XT Studio with XR Module[2]	8.3 kg/18.3 lb	10.5 kg/23.1 lb
ALEXA M XT/XT M Head	2.9 kg/6.39 lb	–
ALEXA M Backend	5.5 kg/12 lb	–
ALEXA XT M Backend	5.8 kg/12.8 lb	–

[1] EVF-1 with Viewfinder Mounting Bracket VMB-1, viewfinder cable, and Center Camera Handle (CCH-1)
[2] Accessories for ALEXA Studio/XT Studio: OVF-1 and CCH-1

Dimensions

ALEXA:	Length: 332 mm/12.95", width: 153 mm/6.02", height: 158 mm/6.22"
ALEXA XT:	Length: 332 mm/12.95", width: 161 mm/6.33", height: 158 mm/6.22"
ALEXA Plus/Plus 4:3:	Length: 332 mm/12.95", width: 175 mm/6.89", height: 158 mm/6.22"
ALEXA XT Plus:	Length: 332 mm/12.95", width: 183 mm/7.20", height: 158 mm/6.22"
ALEXA Studio:	With OVF-1: Length: 402 mm/15.83", width: 268 mm/10.55", height: 241 mm/9.49"
ALEXA XT Studio:	With OVF-1: Length: 402 mm/15.83", width: 268 mm/10.55", height: 241 mm/9.49"
ALEXA M Head:	Length: 212 mm/8.35", width: 129 mm/5.08", height: 149 mm/5.87"
ALEXA M Backend:	Length: 323 mm/12.72", width: 153 mm/6.02", height: 158 mm/6.22"
ALEXA XT M Head:	Length: 212 mm/8.35", width: 129 mm/5.08", height: 149 mm/5.87"
ALEXA XT M Backend:	Length: 323 mm/12.72", width: 161 mm/6.33", height: 158 mm/6.22"

Detailed drawings can be found in the ALEXA Dimensions PDF document on our website at: http://www.arri.com/alexa/downloads

Lens Mount

ARRI Exchangeable Lens Mount (ELM); ships with Lens Adapter PL Mount with LDS contacts, 54 mm stainless steel PL mount, Super 35 centered. All models but Standard ALEXA are outfitted with a Lens Data Mount.

Flange Focal Depth

52.00 mm nominal

Viewfinder

Low latency (≤1 frame delay) electronic color viewfinder ARRI EVF-1 with 1280 x 784 F-LCOS micro display (image: 1280 x 720, status bars: 1280 x 32 above and 1280 x 32 below image) and ARRI LED illumination, both temperature controlled. Image can be flipped for use of viewfinder on camera left or right. Viewfinder Mounting Bracket allows movement of viewfinder forward/backwards, left/right, up/down, 360-degree rotation and placement on camera left or right. EVF-1 controls: viewfinder and basic camera settings, ZOOM button (2.25x pixel to pixel magnification), EXP button (false color exposure check) and jog wheel. ALEXA Studio: Optical viewfinder OVF-1 shows a bright, high contrast image for through-the-lens viewing with low distortion, accurate color fidelity and no delay. Can be used camera left or right and the viewfinder arm telescopes closer/farther from the camera body. Automatically keeps an upright image in all positions with an optional override for manual image rotation. Includes a flip in ND 0.6 contrast filter and 2x de-squeeze module for 2x anamorphic lenses lenses (can also be retrofitted with a 1.3x de-squeeze module). Includes Basic Insert Module BIM-1 for RGB frameglow. Accepts 8x and 10x 435 eyepieces, 435 eyepiece extensions and heated eyecups. With the optional ARRICAM Eyepiece Adapter AEA-1, the OVF-1 can accept the 8x ARRICAM Studio eyepiece, ARRICAM Studio Viewfinder Extension Medium and ARRICAM Studio Viewfinder Zoom Extension. Not compatible with Lite Universal Eyepiece. Can be replaced with the ALEXA Electronic Viewfinder EVF-1 by using the Electronic Viewfinder Adapter EVA-1.

Assistive Displays

For EVF-1 and MON OUT: frame lines, surround view, camera status, false color exposure check, peaking focus check, electronic level, compare stored image with live image, RETURN IN video and anamorphic de-squeeze. MON OUT only: reel & clip number.

For OVF-1: Warning LEDs for REC (recording), BAT (battery low), FULL (SxS PRO card full). ALEXA Studio ground glass holder and frameglow frames are compatible to ARRICAM. Exact alignment of framelines and captured frame, however, requires the use of ALEXA Studio ground glasses and glow masks. For custom aspect ratios not in the price list, please use the online ground glass composer at http://www.arri.com/camera/ground_glass_composer.html.

Control

Camera right: main user interface with a 3" transflective 400 x 240 pixel LCD color screen, illuminated buttons, button lock and jog wheel.

Camera left: operator interface with illuminated buttons, button lock and card swap button.

Optional accessory RCU-4 for remote control via camera ETHERNET connector.

In-camera Recording

ALEXA: Records Apple QuickTime files with ProRes encoding or MXF files with DNxHD encoding onto either one or two (Dual Recording) SxS PRO cards. All codecs maintain legal range levels with embedded audio, timecode and metadata. MXF/DNxHD may require a license key.

ALEXA XT Series: Records ARRIRAW, ProRes or DNxHD onto XR Capture Drives up to 120fps. With SxS Adapter: Apple QuickTime files with ProRes encoding or MXF files with DNxHD encoding onto SxS PRO cards. All codecs maintain legal range levels with embedded audio, timecode and metadata. MXF/DNxHD may require a license key.

Recording Outputs

ALEXA: 2x 1.5 G or 3G REC OUT BNC connectors for ARRIRAW (4:3 or 16:9) or HD-SDI video (16:9). Both with embedded audio, timecode, metadata and recording flag. ARRIRAW: uncompressed 2880 x 1620 (16:9) or 2880 x 2160 (4:3; ALEXA Studio, Plus 4:3 and M only) 12 bit log. Requires an ARRIRAW T-Link certified recorder. HD-SDI: uncompressed 1920 x 1080 (16:9) 4:4:4 RGB or 4:2:2 YCbCr; both legal or extended range. Recording frame rates other than HD standard (23.976, 24, 25, 29.97, 30, 50, 59.94, 60 fps) requires a recorder with Variflag support.

ALEXA XT Series: 2x 1.5 G or 3G REC OUT BNC connectors HD-SDI video (16:9) or MON-OUT clone. HD-SDI: uncompressed 1920 x 1080 (16:9) 4:4:4 RGB or 4:2:2 YCbCr; both legal or extended range. Recording frame rates other than HD standard (23.976, 24, 25, 29.97, 30, 50, 59.94, 60 fps) requires a recorder with Variflag support.

Monitor Output

2x MON OUT BNC connector on ALEXA Plus/Plus 4:3 and Studio for uncompressed 1.5G HD-SDI video: 1920 x 1080 (16:9), 4:2:2 YCbCr; all legal range. ALEXA and ALEXA M offer 1x MON OUT.

Image Processing

16 bit linear internal image processing. Target color spaces for ProRes, DNxHD 220x, REC OUT and MON OUT: Log C and Rec 709. Target color space for DNxHD 145: Rec 709. For Rec 709, a customized look can be applied during record and playback with ARRI Look Files. Optional horizontal image mirroring.

Synchronization

Master/Slave mode for precision sensor sync, synchronized settings, processing, HD-SDI outputs and QuickTime/ProRes or MXF/DNxHD recording for 3D applications. Automated sync of lens settings for 3D applications in Master/Slave mode.

Playback

ALEXA: QuickTime/ProRes or MXF/DNxHD playback from SxS PRO cards to EVF-1, MON OUT and REC OUT. Playback audio embedded in the MON OUT and REC OUT signals and on the headphones jack.

ALEXA XT Series: ARRIRAW, QuickTime/ProRes or MXF/DNxHD playback from XR Capture Drive or QuickTime/ProRes or MXF/DNxHD playback from SxS PRO card to EVF-1, MON OUT and REC OUT. Playback audio embedded in the MON OUT and REC OUT signals and on the headphones jack.

Audio

1x XLR 5 pin AUDIO IN connector for 2 channel, line level balanced audio input, 24 bit/48 kHz A/D conversion, works at 23.976, 24, 25, 29.97 and 30 fps. Audio is recorded uncompressed into the QuickTime/ProRes or MXF/DNxHD files and embedded uncompressed in all HD-SDI outputs, including ARRIRAW T-Link. Max of 2.5 dBm output from AUDIO OUT headphones connector.

Connectors

Connector type	Name	ALEXA (XT)	ALEXA (XT) Plus/4:3/ Studio	ALEXA (XT) M Backend	ALEXA (XT) M Head
SxS Module/XR Module	SxS/–	2/1	2/1	2/1	-/-
BNC recording out HD-SDI, 1.5G/3G	REC-OUT 1/2	2	2	2	–
BNC monitoring out HD-SDI, 1.5G	MON OUT	1	2	1	–
XLR 5 pin audio in	AUDIO IN	1	1	1	–
BNC return signal HD-SDI, 1.5G	RET/SYNC IN	1	1	1	–
LEMO 16 pin external accessories	EXT	1	1	1	–
Fischer 2 pin 24 V power in	BAT	1	1	1	1
Fischer 3 pin 24 V remote start and accessory power out	RS	2	3	2	2
LEMO 2 pin 12 V accessory power out	12 V	1	1	1	–
LEMO 5 pin timecode in/out	TC	1	1	1	–
TRS 3.5 mm headphone mini stereo jack out	AUDIO OUT	1	1	1	–
LEMO custom 16 pin electronic viewfinder	EVF	1	1	–	1
LEMO 10 pin Ethernet with 24 V power	ETHERNET	1	1	1	1
Fischer 5 pin Lens Control System	LCS	–	2	–	–
Fischer 5 pin Lens Data Display	LDD	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	IRIS	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	ZOOM	–	1	–	–
Fischer 12 pin for CLM-2, CLM-3 or later	FOCUS	–	1	–	–
LEMO SMPTE 304M hybrid fiber connector	Optical Link	–	–	1	1

SD Card

For importing ARRI Look Files, camera set up files, frame line files, feature license keys and custom lens tables for the Lens Data Archive (LDA); also used for installing software update packets (SUPs). Stores captured stills from the REC OUT image path in ARRIRAW (.ari, 12 bit), TIFF (.tif, 16 bit), DPX (.dpx, 10 bit) and JPEG (.jpg, 8 bit) format as well as logging files.

Upgrades

The Storage Interface Module (currently available for SxS PRO cards or XR Capture Drives) can be exchanged for future storage modules. The Electronics Interface Module (available as either regular ALEXA or ALEXA Plus versions) can be exchanged for future control electronics. Exchangeable Lens Mount (ELM) allows other lenses beyond PL mount lenses to be used. Simple camera software updates via License keys. Currently available for purchase: Anamorphic De-squeeze, High Speed and DNxHD. ALEXA Studio/ALEXA XT Studio and ALEXA Plus 4:3/ ALEXA XT Plus come with all license keys pre-installed.

Note: All technical data based on Software Update Packet (SUP) 9.0.
All data is subject to change without notice.

Menu Settings & Button Functions

Note: The only differences between ALEXA XT and the classic ALEXA can be found in the RECORDING menu. This chart reflects the ALEXA XT menu, Software Update Packet version 9.0/9.1.

MENU

RECORDING menu

Internal >>
- Mode (Off/ProRes/ARRIRAW)
- Codec/HS Codec (ARRIRAW, DNxHD 145/220x/444, ProRes 422 Proxy/422 LT/422/422 HQ/4444)
- Resolution (HD (1920x1080)/2K (2048x1152/1536)*XT/PLUS 4:3)
- Dual Recording (On/Off)*NON XT
- Prerecord >>
  - Prerecord (On/Off)*PRORES
  - Buffer size (220MB/660MB/1100MB)
- Quick format SxS Card 1/2*NON XT /Capture Drive*XT
- Erase SxS Card 1/2*NON XT

REC OUT >>
- Framerate (23.976/24/25/29.97/30/48/50/59.94/60fps)
- HD-SDI format (422 1.5G SL/1.5G DL/3G SL/444 1.5 DL 444 3G SL/3G DL/RAW*NON XT 1.5G DL/3G SL/3G DL or MON OUT clone)
- Scan format (psf/p)
- Output range (Legal/Extended/Raw)
- REC OUT fps sets sensor fps (On/Off)

MONITORING menu

Electronic viewfinder >>
- Brightness (0-5)
- Rotate image (On/Off)
- Smooth mode (On/Off)
- Surround view (On/Off)
- Frame lines + status info >>
  - Frame lines (On/Off)
  - Surround mask (Black line/Color line/Mask 25%/50%/75%)
  - Center mark (Off/Dot/Cross)
  - Status info (On/Off)
    - Electronic horizon (On/Off)
    - LDS info (On/Off)
- Peaking (Off/On) >>
  - Peaking (On/Off)
  - Peaking level (Low/Medium/High)
- Anamorphic desqueeze*XT/ANAMORPH (Off/1.3x/2.0x/2.0xmag)
- Zoom position (Centered/Eye level)

MON OUT >>
- Framerate (23.976/24/25/29.97/30fps)
- Scanformat (psf/p)
- Surround view (On/Off)
- Frame lines + status info >>
  - Frame lines (On/Off)
  - Surround mask (Black line/Color line/Mask 25%/50%/75%)
  - Center mark (Off/Dot/Cross)
  - Status info (On/Off)
  - Electronic horizon (On/Off)
    - LDS info (On/Off)
    - Camera index letter (On/Off)
- Peaking (Off/On) >>
  - Peaking (On/Off)
  - Peaking level (Low/Medium/High)
- False Color (On/Off)
- Anamorphic desqueeze*ALEXA XT/ANAMORPH (Off/1.3x/2.0x/2.0xmag)

Frame lines >>
- Frame line 1 (choose/add/delete; Off)
- Frame line 2 (choose/add/delete; Off)
- User rectangles >>
  - User rectangles (Off/Rect 1/Rect 2/Rect 1+2)
  - Set rect 1/2 >>
    - Top, Bottom, Left, Right (0 - 1000), Reset
  - Color (Red/Green/Blue/Yellow/Black/White)
  - Intensity (1-4)

RET IN path (EVF, MON OUT, EVF+MON)
Electronic horizonsensitivity (1x, 2x, 4x, 8x, 16x)
False color index >>

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

Menu Settings & Button Functions

MENU

PROJECT menu

Sensor Mode*XT/STUDIO/M/PLUS 4:3 (16:9/4:3/OPEN GATE)*06
Rec. resolution (Menu > Recording > INTERNAL)
Codec (Menu > Recording > INTERNAL)
Project frame rate (23.976/24/25/29.97/30fps)
Camera index (A-Z)
Next reel count (001-999)
Production info >>
- Production
- Prod. Company
- Director
- Cinematographer
- Camera Operator
- Location
- Scene
- Take
- User Info 1/2

SYSTEM menu

Sensor >>
- Sensor mode*ALEXA XT/STUDIO/M/PLUS 4:3 (16:9/4:3)
- Sensor temperature (Standard/High humidity)
- Mirror image horizontal (On/Off)

Power >>
- BAT1 (Plug) warning (10.0-30.0V; 21.0V)
- BAT2 (Onboard) warning (10.0-30.0V; 12.0V)

External sync >>
- Eye index (L/R)
- Sensor sync (Off/EXT master/EXT slave)
- HD out phase (+/-30 clocks; 0 clocks)
- Send HD sync trigger >
- Settings sync (Off/ETH master/ETH slave)

Test signal >>
- Color bar (On/Off)
- Enable test tone (On/Off)
- Test tone level (0 dB(fs)/-9 dB(fs)/-18 dB(fs))

Display + beeper >>
- Display button brightness (0-8)
- Button brightness (Off/Low/Medium/High)
- Run beeper mode (Off/Start/Stop/Start+Stop)

System time + date >>
- set date, time, timezone and daylight saving time

Fan mode (Regular/Rec low)
Network access read-only (On/Off)

SD card >>
- Format + prepare SD card
- Prepare SD card

Firmware >>
- Select update file >>
- Licensed features >>
  - install/delete licenses; save hardware info

FRAME GRABS menu

File format (Jpeg/Tiff/Dpx/Ari)
Compare grab to live image >>
- load grab
- Options — Compare Options >>
  - Compare mode (Toggle/Interleave)
  - Active on EVF (On/Off)
  - Active on MON OUT (On/Off)

Grabbed images inherit REC OUT settings!
Ari only possible, when REC OUT = ARRI RAW

USER SETUPS menu

Save current setup
Load setup
Factory reset

LDS *ALEXA XT M/M

see Lens Data for PLUS/STUDIO

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

Menu Settings & Button Functions

HOME

FPS

set sensor speed (0.75 fps-60fps /120fps*ALEXA XT/HS; 24fps)
add/delete value
HIGHSPEED/EXIT HS*ALEXA XT/HS (boot ALEXA to HS mode; 60-120fps)
MODE (MENU > RECORDING > INTERNAL)
MEDIA INFO (INFO > MEDIA INFO)
SDI FPS >>
REC OUT (23.976, 24, 25, 29.97, 30fps)
MON OUT (23.976, 24, 25, 29.97, 30fps)

AUDIO

adjust CH1+/- (level +20/-10; unity)
adjust CH2+/- (level +20/-10; unity)
AUDIO OUT
set AUDIO OUT
Phones Level (+/-)
OPTIONS
AUDIO OUT > OPTIONS >>
Left out (CH1, CH2, CH1+2, None)
Right out (CH1, CH2, CH1+2, None)
Audio OUT level (Manual, Unity max.)
OPTIONS
AUDIO IN > OPTIONS >>
Record (On/Off)
Channel 1/2 level (Manual/Unity)
Channel 1/2 source (L/R in)
Soundroll (=Tape) (edit name)

SHUTTER

set shutter angle (5.0° - 358.0°; 172.8°)
in highspeed mode (5.0°-356.0°)*ALEXA XT/HS
add/delete value
see calculated exposure time
MIRROR*ALEXA XT STUDIO/STUDIO (On/Off)

EI

set exposure index (160ASA - 3200ASA; 800ASA)
ND FILTER*ALEXA XT STUDIO/STUDIO (On/Off)

COLOR

SET LOOK
choose/delete/load look from SD
ARRI LCC look loaded by default
CDL CONF*ALEXA XT > set ip adress
CDL (On/Off)*ALEXA XT
set COLORPATH
EVF (Look ON/OFF for REC 709)
MON OUT (Look ON/OFF for REC 709)
INTERNAL / REC OUT (Look ON/OFF for REC 709)
GAMMA
COLOR > GAMMA >>
INTERNAL (REC 709, LOG C, RAW*ALEXA XT)
REC OUT (REC 709, LOG C)
MON OUT (REC 709, LOG C)
EVF (REC 709, LOG C)

WB

set WHITEBALANCE (2000K - 11000K, Auto WB; 5600K;
and CC SHIFT)
add/rename/delete value

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

Menu Settings & Button Functions

USER

USER BUTTON ASSIGNMENT

set Button 1, 2, 3

- None
- MON OUT surround
- MON OUT gamma
- MON OUT look
- MON OUT frame lines
- MON OUT status info
- MON OUT false color
- MON OUT peaking
- MON anam. desqu.*XT/ANAMORPH
- Frame lines color
- EVF surround
- EVF gamma
- EVF look
- EVF frame lines
- EVF status info
- EVF zoom
- EVF false color
- EVF peaking
- EVF anam. desqu.*XT/ANAMORPH
- Grab still frame
- Return in active
- Toggle SxS*NON XT/XR
- Check last clip
- Circle clip
- Auto WB
- Phase sensor
- Color bars
- Grab GUI

set Button 4, 5, 6

- None
- MON OUT surround
- MON OUT gamma
- MON OUT look
- MON OUT frame lines
- MON OUT status info
- MON OUT false color
- MON OUT peaking
- MON anam. desqu.*XT/ANAMORPH
- Return in active
- Frame lines color
- Toggle SxS*NON XT/XR
- Phase sensor
- Color bars
- Format Card1*NON XT/XR
- Format Card2*NON XT/XR
- False color index
- Format media*XT
- Mirror shutter*STUDIO

PLAY

SxS PLAYBACK screen

start Playback of last clip (press wheel or PLAY 2x on operator's side)
+/- 10%
CLIPLIST
OPTIONS
PLAY Options >>
- Clip end action (Pause/Loop)
- Show frame lines (On/Off)
- Status info on MON OUT (On/Off)

STEPSIZE (1 frame/1 second)
CIRCLE CLIP

GRAB

FRAMEGRAB screen

save Framegrab to SD Card

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

Menu Settings & Button Functions

INFO

SYSTEM INFORMATION screen

LIVE INFO
SAVE TO SD
VERSION
MEDIA INFO
SYSTEM
FPS INFO

TC

TIMECODE screen

SET TC (SET TO TIME/RESET/MANUAL)
Options
Timecode Options >>
Source (Int TC/Ext LTC)
Mode (Rec run/Free Run)
Generator (Regen/Jam Sync)
User bit source (Internal/UB in Ext TC)
Userbits (set Userbits)
Project (Menu > Project)

LOCK

BUTTON LOCK

locks HOMESCREEN, MENU, PLAY, TC and INFO;
*also locks the buttons on EVF and WRS***ALEXA XT/PLUS & STUDIO !*

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

LEGEND SUP 9.0/9.1

possible values	item A (value 1, value 2, value 3)
factory reset	item B (underlined values represent the 16:9 defaults)
menu hierarchy	1st level menu heading
	2nd level menu heading
leads to new screen	>>
SD card access	

***ALEXA XT** = function available on ALEXA XT/XR only
***ANAMORPH** = requires Anamorphic Desqueeze License
***DNxHD** = requires DNxHD License
***HS** = requires High Speed License
***PLUS** = ALEXA PLUS only
***PLUS 4:3** = ALEXA PLUS 4:3 only
***STUDIO** = ALEXA STUDIO only
***M** = ALEXA M only

Menu Settings & Button Functions

ALEXA (XT) Studio, ALEXA (XT) Plus and ALEXA (XT) M*

WRS

RADIO

STATUS
Channel: 0
Units: 0
Ready/Off

WRS > RADIO >>
WRS radio power (On/Off)
WRS radio channel (0-7)

CAM LEVEL

STATUS READOUT FROM SENSORS
Tilt: 0.0°
Roll: 0.0°

CAM LEVEL > RESET
use to reset your null balance

LENS DATA

LDS READOUT
Status
LENS DATA
displays FOCAL LENGTH, IRIS, FOCUS and DoF close/far
LDS OPTIONS
Lens distance unit (Metric, Imperial, Default Unit)
Circle of confusion (0.013/0.025/0.035/0.050mm)
LDS mount (On/Off)
LDA *available when non-LDS lens in use*
manage lens data for non-LDS lenses

IRIS/ZOOM/FOCUS CLM

CLM STATUS
displays TYPE, DIRECTION and TORQUE (1-4; CLM-3 & 4)
IRIS/ZOOM/FOCUS CLM
set DIRECTION
set TORQUE (only CLM-3 & 4)
CALIBRATE/CALIBRATE ALL motors

*on ALEXA XT M and ALEXA M via SYSTEM > LDS
ALEXA SUP 9.0/9.1 underlined values represent the factory reset

Menu Settings & Button Functions
Electronic Viewfinder EVF-1

FPS
set sensor speed (0.75 fps-60fps /120fps*XT/HS; 24fps)

SHUTTER
set shutter angle (5.0° - 358°; 172,8°) in High Speed Mode 5.0°-356.0°)*XT/HS

EI
set exposure index (160ASA - 3200ASA; 800ASA)

WB
set white balance (2000K - 11000K, Auto WB; 5600K; and CC SHIFT)

false color exposure check (toggle mode)

get 2.25x image magnification (toggle mode)

EVF menu

Brightness (0-5)
Rotate Image (On/Off)
Smooth Mode (On/Off)
Surround View (On/Off)
Surround Mask (Black line/Color Line/Mask 25%/50%/75%)
Status Info (On/Off)
Frame Lines (On/Off)
Select Frame Lines 1 (choose from list)
Select Frame Lines 2 (choose from list)
Center Mark (Off/Dot/Cross)
User Rectangles (Off/Rect 1/Rect 2/Rect 1&2)
Edit User Rectangles (only when User Rectangles active)
Frame Lines Color (Red/Green/Blue/Yellow/Black/White)
Frame Lines Intensity (1-4)

Mirror Control on ALEXA (XT) Studio

switch to VIEW-mode (Operator sees an image)
press 2x for spinning mirror

switch to GATE-mode (sensor & all video outs "see" an image)
press 2x for spinning mirror

ALEXA SUP 9.0/9.1 underlined values represent the factory reset

ARRI Lenses

ARRI/ZEISS Master Anamorphic Lenses

Name	Lens Mount[1]	Aperture	Close Focus[2]	Magnification Ratio[3]	Length[4]	Length[14]	Front Diameter[5]	Maximum Housing Diameter	Weight (kg)	Weight (lb)	Angle of View H - V	Entrance Pupil[6]
											Super 35 Cinemascope[8] ID = 29.26 mm[7]	
Master Anamorphic 35mm/T1.9	PL LDS	T1.9 - T22	0.75 m / 2'6"	H: 1:32.3 V: 1: 16.1	183 mm / 7.2"	235 mm / 9.3"	95 mm / 3.7"	114 mm / 4.5"	2,6	5.7	65.5° - 29.9°	178.8 mm / 7.0"
Master Anamorphic 40mm/T1.9	PL LDS	T1.9 - T22	0.70 m / 2'4"	H: 1:25.6 V: 1: 12.8	183 mm / 7.2"	235 mm / 9.3"	95 mm / 3.7"	114 mm / 4.5"	2,7	6.0	58.7° - 26.3°	176.0 mm / 6.9"
Master Anamorphic 50mm/T1.9	PL LDS	T1.9 - T22	0.75 m / 2'6"	H: 1:22.2 V: 1: 11.1	183 mm / 7.2"	235 mm / 9.3"	95 mm / 3.7"	114 mm / 4.5"	2,6	5.7	48.5° - 21.2°	171.5 mm / 6.8"
Master Anamorphic 60mm/T1.9	PL LDS	T1.9 - T22	0.90 m / 3'	H: 1:24.3 V: 1: 12.2	183 mm / 7.2"	235 mm / 9.3"	95 mm / 3.7"	114 mm / 4.5"	2,7	6.0	41.1° - 17.7°	152.0 mm / 6.0"
Master Anamorphic 75mm/T1.9	PL LDS	T1.9 - T22	0.90 m / 3'	H: 1:19.6 V: 1: 9.8	183 mm / 7.2"	235 mm / 9.3"	95 mm / 3.7"	114 mm / 4.5"	2,6	5.7	33.4° - 14.2°	136.7 mm / 5.4"
Master Anamorphic 100mm/T1.9	PL LDS	T1.9 - T22	0.95 m / 3'1"	H: 1:14.7 V: 1: 7.4	206 mm / 8.1"	258 mm / 10.2"	95 mm / 3.7"	114 mm / 4.5"	3,1	6.8	25.4° - 10.7°	145.9 mm / 5.7"
Master Anamorphic 135mm/T1.9	PL LDS	T1.9 - T22	1.20 m / 3'11"	H: 1:15.6 V: 1:7.8	226 mm / 9.1"	278 mm / 10.7"	95 mm / 3.7"	114 mm / 4.5"	3,8	8.4	18.9° - 7.9°	129.3 mm / 5.1"

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI/ZEISS Master Prime Lenses

Name	Lens Mount[1]	Aperture	Close Focus[2]	Magnification Ratio[3]	Length[4]	Length[14]	Front Diameter[5]	Maximum Housing Diameter	Weight	Angle of view H – V – D			Entrance pupil[6]
										Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	ANSI Super 35[11] ID = 31.14 mm[7]	
Master Prime 12 mm/T1.3	PL LDS	T1.3 - T22	0.40 m / 16"	1:16.5	197 mm / 7.8"	249 mm / 9.80"	156 mm / 6.1"	159 mm / 6.3"	2.9 Kg / 6.4 lb	83.87° -66.44° - 96.13°	88.85° - 72.70° - 101.97°	90.98° - 74.78° - 104.26°	208,3 mm / 8.2"
Master Prime 14 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.7	172 mm / 6.8"	224 mm / 8.82"	114 mm / 4.5"	128 mm / 5"	2.4 Kg / 5.3 lb	76.42° - 59.41° - 88.52°	81.24° - 65.39° - 94.07°	83.44° - 67.49° - 96.33°	189,3 mm / 7.5"
Master Prime 16 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.8	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb	70.07° - 53.79° - 81.76°	74.85° - 59.56° - 87.24°	76.87° - 61.50° - 89.33°	158,8 mm / 6.3"
Master Prime 18 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:11.0	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb	63.98° - 48.60° - 75.29°	68.56° - 53.97° - 80.52°	70.53° - 55.80° - 82.48°	154,9 mm / 6.1"
Master Prime 21 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:9.5	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.4 Kg / 5.3 lb	55.96° - 42.05° - 66.60°	60.22° - 46.85° - 71.70°	62.07° - 48.50° - 73.66°	149,3 mm / 5.9"
Master Prime 25 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:8.6	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.6 Kg / 5.1 lb	48.12° - 35.79° - 57.97°	52.01° - 40.00° - 62.89°	53.72° - 41.45° - 64.81°	135,9 mm / 5.4"
Master Prime 27 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:7.8	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb	43.82° - 32.45° - 53.08°	47.45° - 36.31° - 57.80°	49.06° - 37.64° - 59.66°	136,7 mm / 5.4"
Master Prime 32 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:7.1	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.3 Kg / 5.1 lb	38.84° - 28.74° - 47.10°	42.07° - 32.16° - 51.31°	43.51° - 33.35° - 52.98°	128,4 mm / 5.1"
Master Prime 35 mm/T1.3	PL LDS	T1.3 - T22	0.35 m / 14"	1:6.4	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.2 Kg / 4.8 lb	35.04° - 25.82° - 42.64°	38.01° - 28.94° - 46.52°	39.33° - 30.02° - 48.04°	126,9 mm / 4.9"
Master Prime 40 mm/T1.3	PL LDS	T1.3 - T22	0.40 m / 16"	1:7.0	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.3 Kg / 5.1 lb	30.91° - 22.75° - 37.68°	33.55° - 25.51° - 41.15°	34.73° - 26.46° - 42.52°	119,6 mm / 4.7"
Master Prime 50 mm/T1.3	PL LDS	T1.3 - T22	0.50 m / 20"	1:7.0	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.7 Kg / 5.9 lb	25.02° - 18.27° - 30.81°	27.26° - 20.53° - 33.88°	28.26° - 21.32° - 35.13°	136,1 mm / 5.4"
Master Prime 65 mm/T1.3	PL LDS	T1.3 - T22	0.65 m / 2'3"	1:8.2	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.6 Kg / 5.7 lb	19.27° - 14.06° - 23.72°	20.99° - 15.80° - 26.08°	21.59° - 16.58° - 27.00°	107,3 mm / 4.2"
Master Prime 75 mm/T1.3	PL LDS	T1.3 - T22	0.80 m / 2'9"	1:8.9	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.8 Kg / 6.2 lb	16.66° - 12.17° - 20.51°	18.15° - 13.67° - 22.56°	18.82° - 14.20° - 23.39°	102,5 mm / 4.0"
Master Prime 100 mm/T1.3	PL LDS	T1.3 - T22	1.00 m / 3'6"	1:8.9	153 mm / 6"	205 mm / 8.07"	114 mm / 4.5"	128 mm / 5"	2.9 Kg / 6.4 lb	12.60° - 9.17° - 15.56°	13.74° - 10.32° - 17.14°	14.25° - 10.72° - 17.79°	57,2 mm / 2.3"
Master Prime 135 mm/T1.3	PL LDS	T1.3 - T22	0.95m / 3'3''	1:6.6	172 mm / 6.8"	224 mm / 8.82"	114 mm / 4.5"	128 mm / 5"	2.8 Kg / 6.2 lb	9.49° - 6.91° - 11.72°	10.35° - 7.77° - 12.91°	10.73° - 8.07° - 13.40°	30.1 mm / 1.2"
Master Prime 150 mm/T1.3	PL LDS	T1.3 - T22	1.50 m / 4'11"	1:10.3	210 mm / 8.3"	262 mm / 10.31"	134 mm / 5.3"	137 mm / 5.4"	4.0 Kg / 8.8 lb	8.53° - 6.22° - 10.53°	9.30° - 6.99° - 11.59°	9.65° - 7.26° - 12.03°	-89,0 mm / -3.5"

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

ARRI/ZEISS Ultra Prime Lenses

Name	Lens Mount[1]	Aperture	Close Focus[2]	Length[4]	Front Diameter[5]	Maximum housing diameter	Weight	Angle of view H – V – D			Entrance pupil[6]
								Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	ANSI Super 35[11] ID = 31.14 mm[7]	
Ultra Prime 8R	PL	T2.8 to T22	0.35 m / 13.8"	130 mm / 5.1"	134 mm / 5.3"	137 mm / 5.4"	2.0 Kg / 4.4 lb	107.1° - 89.1° - 118.3°	111.8° - 95.8° - 123.1°	113.7° - 98.0° - 124.8°	155,2 mm / 6.1"
Ultra Prime 12	PL	T2.0 to T22	0.30 m / 11.8"	140 mm / 5.5"	156 mm / 6.1"	159 mm / 6.3"	2.0 Kg / 4.4 lb	85.5° - 67.8° - 97.6°	90.5° - 74.2° - 103.2°	92.6° - 76.3° - 105.2°	113,4 mm / 4.4"
Ultra Prime 14	PL	T1.9 to T22	0.22 m / 8.7"	112 mm / 4.4"	114 mm / 4.5"	114 mm / 4.5"	1.8 Kg / 4.0 lb	75.6° - 58.9° - 87.6°	80.5° - 64.8° - 93.2°	82.6° - 66.8° - 95.4°	91,3 mm / 3.5"
Ultra Prime 16	PL	T1.9 to T22	0.25 m / 9.8"	94 mm / 3.7"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	68.6° - 52.8° - 80.3°	73.3° - 58.4° - 85.8°	75.4° - 60.2° - 88.1°	85,1 mm / 3.3"
Ultra Prime 20	PL	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	58.9° - 44.6° - 69.8°	63.2° - 49.6° - 75.1°	65.1° - 51.3° - 77.2°	73,3 mm / 2.8"
Ultra Prime 24	PL	T1.9 to T22	0.30 m / 11.8"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	50.5° - 37.8° - 60.5°	54.4° - 42.2° - 65.4°	56.2° - 43.7° - 67.5°	67,4 mm / 2.6"
Ultra Prime 28	PL	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	43.6° - 32.4° - 52.6°	47.1° - 36.2° - 57.2°	48.7° - 37.5° - 59.0°	67,3 mm / 2.6"
Ultra Prime 32	PL	T1.9 to T22	0.35 m / 13.8"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.1 Kg / 2.4 lb	38.6° - 28.5° - 46.8°	41.8° - 31.9° - 51.0°	43.2° - 33.1° - 52.7°	61,1 mm / 2.4"
Ultra Prime 40	PL	T1.9 to T22	0.38 m /15"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	31.0° - 22.8° - 37.9°	33.7° - 26.6° - 41.5°	34.9° - 26.6° - 42.9°	59,2 mm / 2.3"
Ultra Prime 50	PL	T1.9 to T22	0.60 m / 23.6"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	24.3° - 17.8° - 29.8°	26.5° - 20.0° - 32.8° -	27.4° - 20.8° - 33.9°	13,4 mm / 0.5"
Ultra Prime 65	PL	T1.9 to T22	0.65 m / 25.6	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.1 Kg / 2.4 lb	19.4° - 14.2° - 23.9°	21.9° - 16.5° - 27.2°	21.9° - 16.5° - 27.2°	19,0 mm / 0.7"
Ultra Prime 85	PL	T1.9 to T22	0.90 m / 35.4"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	15.2° - 11.1° - 18.7°	16.5° - 12.4° - 20.5°	17.1° - 12.9° - 21.3°	3,5 mm / 0.1"
Ultra Prime 100	PL	T1.9 to T22	1.00 m / 39.4"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	12.3° - 8.9° - 15.2°	13.4° - 10.0° - 16.7°	13.9° - 10.4° - 17.3°	12,4 mm / 0.4"
Ultra Prime 135	PL	T1.9 to T22	1.50 m / 59.1"	119 mm / 4.7"	95 mm / 3.7"	102 mm / 4.0"	1.6 Kg / 3.5 lb	9.3° - 6.7° - 11.5°	10.1° - 7.6° - 12.6°	10.5° - 7.9° - 13.1°	-56,9 mm / -2.2"
Ultra Prime 180	PL	T1.9 to T22	2.60 m / 102.4"	166 mm / 6.5"	114 mm / 4.5"	119 mm / 4.7"	2.6 Kg / 5.7 lb	6.9° - 5.1° - 8.5°	7.6° - 5.7° - 9.5°	7.9° - 5.9° - 9.9°	-19,7 mm / -0.7"

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

ARRI/ZEISS LDS Ultra Prime Lenses

Name	Lens Mount[1]	Aperture	Close Focus[2]	Length[4]	Front Diameter[5]	Maximum housing diameter	Weight	Angle of view H – V – D			Entrance pupil[6]
								Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	ANSI Super 35[11] ID = 31.14 mm[7]	
LDS Ultra Prime 12	PL LDS	T2.0 to T22	0.30 m / 11.8"	140 mm / 5.5"	156 mm / 6.1"	159 mm / 6.3"	2.0 Kg / 4.4 lb	85.5° - 67.8° - 97.6°	90.5° - 74.2° - 103.2°	92.6° - 76.3° - 105.2°	113,4 mm / 4.4"
LDS Ultra Prime 14	PL LDS	T1.9 to T22	0.22 m / 8.7"	112 mm / 4.4"	114 mm / 4.5"	114 mm / 4.5"	1.8 Kg / 4.0 lb	75.6° - 58.9° - 87.6°	80.5° - 64.8° - 93.2°	82.6° - 66.8° - 95.4°	91,3 mm / 3.5"
LDS Ultra Prime 16	PL LDS	T1.9 to T22	0.25 m / 9.8"	94 mm / 3.7"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	68.6° - 52.8° - 80.3°	73.3° - 58.4° - 85.8°	75.4° - 60.2° - 88.1°	85,1 mm / 3.3"
LDS Ultra Prime 20	PL LDS	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	58.9° - 44.6° - 69.8°	63.2° - 49.6° - 75.1°	65.1° - 51.3° - 77.2°	73,3 mm / 2.8"
LDS Ultra Prime 24	PL LDS	T1.9 to T22	0.30 m / 11.8"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	50.5° - 37.8° - 60.5°	54.4° - 42.2° - 65.4°	56.2° - 43.7° - 67.5°	67,4 mm / 2.6"
LDS Ultra Prime 28	PL LDS	T1.9 to T22	0.28 m / 11"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	43.6° - 32.4° - 52.6°	47.1° - 36.2° - 57.2°	48.7° - 37.5° - 59.0°	67,3 mm / 2.6"
LDS Ultra Prime 32	PL LDS	T1.9 to T22	0.35 m / 13.8"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.1 Kg / 2.4 lb	38.6° - 28.5° - 46.8°	41.8° - 31.9° - 51.0°	43.2° - 33.1° - 52.7°	61,1 mm / 2.4"
LDS Ultra Prime 40	PL LDS	T1.9 to T22	0.38 m /15"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	31.0° - 22.8° - 37.9°	33.7° - 26.6° - 41.5°	34.9° - 26.6° - 42.9°	59,2 mm / 2.3"
LDS Ultra Prime 50	PL LDS	T1.9 to T22	0.60 m / 23.6"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.0 Kg / 2.2 lb	24.3° - 17.8° - 29.8°	26.5° - 20.0° - 32.8° -	27.4° - 20.8° - 33.9°	13,4 mm / 0.5"
LDS Ultra Prime 65	PL LDS	T1.9 to T22	0.65 m / 25.6	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.1 Kg / 2.4 lb	19.4° - 14.2° - 23.9°	21.9° - 16.5° - 27.2°	21.9° - 16.5° - 27.2°	19,0 mm / 0.7"
LDS Ultra Prime 85	PL LDS	T1.9 to T22	0.90 m / 35.4"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	15.2° - 11.1° - 18.7°	16.5° - 12.4° - 20.5°	17.1° - 12.9° - 21.3°	3,5 mm / 0.1"
LDS Ultra Prime 100	PL LDS	T1.9 to T22	1.00 m / 39.4"	91 mm / 3.6"	95 mm / 3.7"	104 mm / 4.1"	1.2 Kg / 2.6 lb	12.3° - 8.9° - 15.2°	13.4° - 10.0° - 16.7°	13.9° - 10.4° - 17.3°	12,4 mm / 0.4"
LDS Ultra Prime 135	PL LDS	T1.9 to T22	1.50 m / 59.1"	119 mm / 4.7"	95 mm / 3.7"	102 mm / 4.0"	1.6 Kg / 3.5 lb	9.3° - 6.7° - 11.5°	10.1° - 7.6° - 12.6°	10.5° - 7.9° - 13.1°	-56,9 mm / -2.2"
LDS Ultra Prime 180	PL LDS	T1.9 to T22	2.60 m / 102.4"	166 mm / 6.5"	114 mm / 4.5"	119 mm / 4.7"	2.6 Kg / 5.7 lb	6.9° - 5.1° - 8.5°	7.6° - 5.7° - 9.5°	7.9° - 5.9° - 9.9°	-19,7 mm / -0.7"

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

ARRI/FUJINON Alura Zooms Lenses

Name	Lens Mount[1]	Focal Length *Wide*	Focal Length *Long*	Focal Length *Ratio*	Aperture	Close Focus[2]	Magnification Ratio[3]	Length[4]	Front Diameter[5]	Maximum Housing Diameter	Weight	Focal Length	Angle of view H – V – D			Entrance pupil[6]
													Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	Alexa/D-21 HD[12] ID = 27.26 mm[7]	
Alura Zoom 15.5-45	PL LDS	15.5	45	2.9	T2.8 - T22	0.6 m / 2'0"	1:8.1	228 mm / 9.0"	114 mm / 4.5"	114 mm / 4.5"	2.2 Kg / 4.9 lb	at 15.5 mm	70.7° - 54.6° - 82.5°	74.9° - 46.7° - 82.7°	78.5° - 49.4° - 86.3°	237.0 mm / 9.3"
												at 25 mm	47.5° - 35.5° - 57.1°	50.8° - 29.9° - 57.2°	53.8° - 31.8° - 60.4°	230.9 mm / 9.1"
												at 45 mm	27.5° - 20.2° - 33.6°	29.6° - 16.9° - 33.7°	31.4° - 18° - 35.8°	222.6 mm / 8.8"
Alura Zoom 30-80	PL LDS	30	80	2.7	T2.8 - T22	0.6 m / 2'0"	1:4.9	228 mm / 9.0"	114 mm / 4.5"	114 mm / 4.5"	2.2 Kg / 4.9 lb	at 30 mm	40.3° - 29.9° - 48.8°	43.2° - 25.1° - 48.9°	45.8° - 26.7° - 51.7°	219.3 mm / 8.6"
												at 50 mm	24.8° - 18.2° - 30.4°	26.7° - 15.2° - 30.5°	28.4° - 16.2° - 32.4°	201.0 mm / 7.9"
												at 80 mm	15.7° - 11.4° - 19.3°	16.9° - 9.6° - 19.3°	18° - 10.2° - 20.6°	187.4 mm / 7.4"
Alura Zoom 18-80	PL	18	80	4.4	T2.6 - T22	0.7 m / 2'4"	1:5.5	285 mm / 11.2"	134 mm / 5.3"	134 mm / 5.3"	4.7 Kg / 10.4 lb	at 18 mm	62.8° - 48.0° - 74.1°	67.4° - 53.1° - 79.6°	66.8° - 40.7° - 74.3°	264.0 mm / 10.4"
												at 50 mm	24.8° - 18.2° - 30.4°	27.0° - 20.4° - 33.4°	26.7° - 15.2° - 30.5°	231.6 mm / 9.1"
												at 80 mm	15.6° - 11.4° - 19.3°	17.1° - 12.8° - 21.2°	16.9° - 9.5° - 19.3°	213.9 mm / 8.4"
Alura Zoom 45-250	PL	45	250	5.6	T2.6 - T22	1.2 m / 3'11"	1:4	370 mm / 14.6"	134 mm / 5.3"	153 mm / 6"	7.5 Kg / 16.5 lb	at 45 mm	27.5° - 20.2° - 33.6°	29.9° - 22.6° - 36.9°	29.6° - 16.9° - 33.7°	234.4 mm / 9.6"
												at 150 mm	8.4° - 6.1° - 10.4°	9.1° - 6.9° - 11.4°	9.1° - 5.1° - 10.4°	2.0 mm / 0.1"
												at 250 mm	5.0° - 3.7° - 6.2°	5.5° - 4.1° - 6.9°	5.4° - 3.1° - 6.2°	-101.5 mm / -4.0"

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

ARRI/FUJINON Alura LDS Extender

Name	Weight	Diameter without knobs	Length (mm) without knobs
Alura LDS Extender 1.4x	300 g / 0.66 lb	77 mm / 3.03″	44 mm / 1.73″
Alura LDS Extender 2.0x	530 g / 1.17 lb	77 mm / 3.03″	60 mm / 2.36″

Combining the Alura Zooms with Alura Extenders

Alura Zoom	Alura Extender	Resulting Combination
Alura 15.5-45 / T2.8	Alura LDS Extender 1.4x	Alura 22-63 / T4.0
Alura 15.5-45 / T2.8	Alura LDS Extender 2.0x	Alura 31-90 / T5.6
Alura 30-80 / T2.8	Alura LDS Extender 1.4x	Alura 42-112 / T4.0
Alura 30-80 / T2.8	Alura LDS Extender 2.0x	Alura 60-160 / T5.6
Alura 18-80 / T2.6	Alura LDS Extender 1.4x	Alura 25-112 / T3.7
Alura 18-80 / T2.6	Alura LDS Extender 2.0x	Alura 36-160 / T5.2
Alura 45-250 / T2.6	Alura LDS Extender 1.4x	Alura 63-350 / T3.7
Alura 45-250 / T2.6	Alura LDS Extender 2.0x	Alura 90-500 / T5.2

ARRI Ultra Wide Zoom UWZ 9.5-18

Name	Lens Mount[1]	Focal Length *Wide*	Focal Length *Long*	Focal Length *Ratio*	Aperture	Close Focus[2]	Magnification Ratio[3]	Length[4]	Front Diameter[5]	Maximum Housing Diameter[15]	Weight	Focal Length	Angle of view H – V – D			Entrance pupil[6]
													Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	Alexa HD[12] ID = 27.26 mm[7]	
UWZ 9.5-18	PL LDS	9.5	18	1.9	T2.9 - T22	0.55 m / 1'9"	1:10.7	335.5 mm / 13.2"	156 mm / 6.1"	112 mm / 4.4"	4.8 Kg / 10.5 lb	at 9.5 mm	98.6° - 80.3° - 110.5°	103.5° - 87.0° - 115.7°	103.0° - 70.3° - 110.6°	310.4 mm / 12.22″
												at 14 mm	76.3° - 59.5° - 88.3°	81.2° - 65.5° - 94.0°	80.6° - 51.1° - 88.5°	309.4 mm / 12.18″
												at 18 mm	62.8° - 47.9° - 74.1°	67.3° - 53.1° - 79.5°	66.8° - 40.8° - 74.2°	308.0 mm / 12.13″

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

ARRI/ZEISS Master Macro Lens

Name	Lens Mount[1]	Aperture	Close Focus[2]	Magnification Ratio[3]	Length[4]	Front Diameter[5]	Weight	Horizontal Angle of View		
								Normal 35[9] ID = 27.20 mm[7]	DIN Super 35[10] ID = 30.00 mm[7]	ANSI Super 35[11] ID = 31.14 mm[7]
Master Macro 100 mm/T2.0	PL LDS	T2.0/T4.3 to T32	0.35 m / 13 3/4"	1:1	210.0 mm / 8.27"	114 mm / 4.5"	2.6 kg / 5.7 lbs	12.42°	13.52°	14.02°

For Annotations, see Page 120.
All data is subject to change without notice.

ARRI Lenses

Annotations

Operation Temperature: -20°C to +40°C / -4°F to +104°F
Storage/Transport Temperature: -40C to +70°C / -40°F to +158°F

1 Positive locking (PL) 54mm stainless steel lens mount on some models with Lens Data System (LDS) contacts
2 Close focus is measured from the film/sensor plane
3 Magnification ratio is the relationship of the size of an object on the film/sensor plane (first number) to the size of that object in real life (second number) at the close focus setting (on zoom lenses also at the telephoto zoom setting; for Master Anamorphic Lenses: horizontal (H) and vertical (V)
4 Length is measured from the lens mount to the front of the lens housing
5 Diameter of the lens/matte box interface; Maximum lens housing diameter for the Master Macro 100 is 138 mm.
6 The distance from the entrance pupil to the film/sensor plane (at focus = infinity). Positive numbers indicate an entrance pupil in front, negative numbers indicate an entrance pupil behind the film/sensor plane. The entrance pupil (often mistakenly called "nodal point") is the center of perspective; moving the camera/lens system around the center of the entrance pupil prevents parallax errors. While largely irrelevant for live action, this measurement is important for special effects work.
7 The image diameter (ID) is the diameter of the image circle needed for the respective format. These lenses are designed for the largest ID given here.
8 Horizontal (H) and vertical (V) angles of view for a Super 35 Cinemascope camera aperture (22,5mm x 18,7mm / 0.8858" x 0.7362")
9 Horizontal (H), vertical (V) and diagonal (D) angles of view for a Normal 35 Academy camera aperture (1.37:1, 22mm x 16mm / 0.8661" x 0.6299")
10 Horizontal (H), vertical (V) and diagonal (D) angles of view for a DIN Super 35 Silent camera aperture (1.33:1, 24mm x 18mm / 0.944" x 0.7087")
11 Horizontal (H), vertical (V) and diagonal (D) angles of view for an ANSI Super 35 Silent camera aperture (1.33:1, 24.9mm x 18.7mm / 0.980" x 0.7362")
12 Horizontal (H), vertical (V) and diagonal (D) angles of view for the Alexa/D-21 HD camera aperture (1.78:1, 2880 x 1620 pixels, 23.76 mm x 13.37mm / 0.935" x 0.526")
14 Length is measured from the sensor plane to the front of the lens housing.
15 Excluding front and gear.

ARRI Lenses

Resources and Contacts

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	Monday – Friday: 09:00 – 18:00 (CET)	**Rome, Italy** ARRI Italia S.r.l.	service@arri.it	+39 335 749 00 70
	Monday – Saturday 09:00 - 18:00 (MSK)	**Moscow, Russia** Bars-Pro Ltd.	arri@bars-pro.ru	+7 (495) 415-98-13 +7 (495) 415-98-14 +7 (495) 415-98-15
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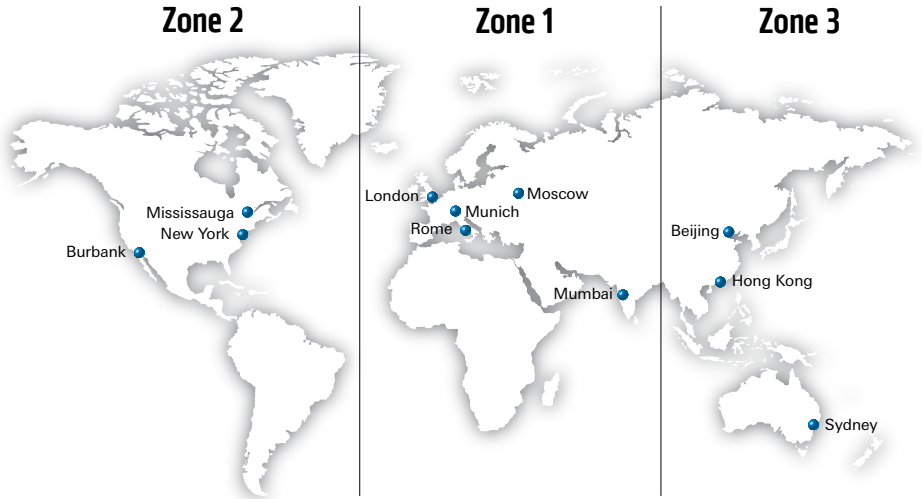

ARRI Service is the first port of call for all questions concerning not only the ALEXA cameras, but all ARRI cameras ever made, with worldwide service centers and 24h availability on Monday to Friday.

Well trained technicians cover all hardware- and software-related issues, upgrades or e.g. the recovery of cards that have been accidentally erased.

ARRI Digital Workflow Solutions

The Digital Workflow Solutions (DWS) group deals with all workflow related issues including ARRI Look File handling, data copying, backups, quality check, LUTs, metadata or working with Log C files. In addition the DWS group provides support for such tools as the ARRIRAW Converter, ARRI Look Creator, ARRI LUT Generator and ALEXA Frameline Composer.

Feel free to contact DWS at digitalworkflow@arri.de

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